The Contemporary Western Idealisation of Female Slenderness: An Evolutionary Conception

By

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A thesis submitted in partial fulfilment of the requirements for the degree of Master of Arts in Psychology.

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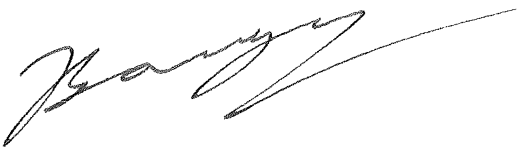
1996

Abstract

This research places the contemporary Western idealisation of female slenderness in an evolutionary framework. It describes how this ideal is a manifestation of a male sexual preference for youth and a female deceptive reproductive strategy. The study was designed to establish how body fat influences people's perceptions of females using more naturalistic stimulus material than previously employed. The responses from the sample of one hundred and twenty four university students accord with Western cosmetic behaviour, prevailing normalising images and the fundamental assumptions of the theoretical construct proposed in this thesis. The present research illustrates the explanatory power, depth, and fertility of Dual Inheritance theory and how it can be applied to contemporary human behaviour.

Acknowledgments

I would like to thank Jim Pollard for his valued guidance throughout the entirety of this research, and Bronwyn Evans for her pains proof-reading the final draft. My sincere gratitude also goes to Dr P. Barrett for sharing his statistical knowledge and Dr C. Bulik for her suggested changes to assure the materials used in the study were presented sensitively. I would also like to thank my father, mother and sister for their needed encouragement and support.



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Introduction

The body shape idealised for women in **Western** industrialised culture has undergone recent and dramatic changes. Western, for the purposes of this thesis, is defined as the culture of West European and North American countries. Social scientists have attempted to quantify the declining appeal of body fat in Western conceptions of female beauty. Select collectives believed to represent cultural ideals of female appearance provide a quantifiable source of data that has been used to trace changes in the definition of attractiveness.

Garner, Garfinkel, Schwartz, and Thompson (1980) are responsible for one of the most frequently cited studies that used this source. The authors collected body measurements from *Playboy* centrefolds and *Miss America* pageant winners and contestants over the period from 1959 to 1978. The percentage of expected body weight was calculated for each member of the sample by dividing their actual weight with their expected average weight as determined by the *Society of Actuaries Table*. They found that both groups over this period showed a significant decrease in the percentage of their expected body weight.

On average, pageant winners showed a more marked change in body weight over the period studied than pageant contestants. The winners' weights were increasingly lower than their expected body weight than were those of the contestants. This suggests slenderness was a quality that became increasingly favoured in *Miss America* pageants during the period studied. *Playboy* centrefolds tended to be closer to their expected body weights and showed a less pronounced decline over time than did pageant contestants. The authors recovered the bust, waist and hip measurements published with each *Playboy* centrefold over the period of study. The centrefolds showed a significant reduction in bust and hip measurements, and waists became larger.

Wiseman, Gray and Mosimann (1992) compared the findings of Garner et.al. (1980) with the body weights and shapes of *Playboy* and *Miss America* pageant contestants between 1979 and 1988. Wiseman et.al. (1992) found that the pattern of decline in body weight for *Miss America* pageant winners and contestants, observed in the earlier sample, had continued. However, winners and contestants did not significantly differ, and the rate of decline over this period appeared to be leveling off, and stabilising at thirteen to nineteen percent below their expected body weight. Wiseman et.al. (1992) point out that a body weight below fifteen percent of that expected is described by the DSM-111R as one of the criteria for anorexia nervosa. Unlike the earlier sample, the average percentage of expected body weight for *Playboy* centrefolds between 1979 and 1988 was below that of *Miss America* pageant contestants for allying years. Wiseman et.al. (1992) collected the bust, waist, and hip measurements for both groups. Only one measure changed significantly over their period of study: *Miss America* contestants showed a significant decrease in hip size.

Morris, Cooper, and Cooper (1989) examined changes in the body shapes of another select collective believed to represent ideals for female attractiveness: fashion models. They found that the models recruited by a respectable British agency between 1967 and 1987 progressively increased in height and waist size, whereas their hip and bust sizes showed no significant change. They did not collect data on actual body weight. The authors believe that the data they collected was sufficient to conclude that fashion models have tended to become less curvaceous and correspondingly more tubular in appearance.

Silverstein, Perdue, Peterson, and Kelly (1986) found that the perceived bust to waist ratio of fashion models in photographs from the *Ladies Home Journal*, and *Vogue* also decreased significantly over the preceding twenty years. They observed a similar decline in the perceived body weight of American television personalties and stars. They found that

female television personalties and film stars were perceived as slimmer than those in the past, and slimmer and younger than equivalent male media figures.

It is evident from the research cited up to this point that the collectives believed to represent Western cultural ideals of female attractiveness have shown an increasing emphasis on a slender, compact and tubular body shape. This research highlights the prevailing standard of female attractiveness that is portrayed in contemporary Western media and demonstrates how it has changed over the last twenty years. It does not however, illustrate whether the standard presented by these media images reflects and/or influences the beliefs and behaviour of the public. Bardo (1990) explains how interpreting cultural images is made complex by the diversity of individual and group differences that intersect with, resist, and give distinct meaning to, dominating normalising images. The articles cited below suggest that Western male sexual preferences do not clearly match the standards of female physical attractiveness presented in media images. However, research in this area is limited. It is evident that Western womens' perceptions of their bodies and the ways in which they seek to change them concur with the media images they are presented with.

Quinsey, Rice, Harris, and Reid (1993) reviewed research that sought to directly examine Western males' sexual attitudes and preferences pertaining to female body shape. The authors found few studies to exist, but the findings to be convergent. All the studies they could find relied on the subjects ratings of line drawings or silhouettes designed to represent different levels and distributions of body fat. Quinsey et.al. (1993) in light of their review concluded.. "*generally the characteristics of females' bodies that are attractive to adult males appear to be those associated with young, sexually mature females of average weight*" (Chapter 7, pg. 149). In accordance with the standardised images presented in the media, Quinsey

et.al. (1993) conclude that in most of the papers they reviewed males where found to perceive high levels of curvaceousness unattractive.

Fallon and Rozin (1985), in one of the studies reviewed by Quinsey et.al. (1993), compared male and female differences in the perceived attractiveness of female body shapes. They found that American male college students typically preferred a figure drawn to represent a women approximately ten percent below the average body weight for the female Western population. American college women tended to believe males prefer a female body shape thinner than males' actual responses suggest. They observed that, on average, the ideal body shape the women they sampled wanted, was a figure much slimmer than the males found attractive.

Fallon and Rozin (1985) and more recently Stice and Shaw (1994) found that Western women today tend to misjudge their own weight, typically seeing themselves as heavier than they actually are. Subsequently women typically report higher levels of dissatisfaction with their body weight than men. Polivey, Garner, and Garfinkel (1986) claim that as a result, Western women are more likely to diet to lose weight than men. Ritchie's (1988) recent study of dieting behaviour confirm the conclusions of Polivey et.al. (1985): seventy percent of the women in her sample stated they had been on a diet to lose body fat, compared to only twenty percent of the men sampled. She found that women typically start dieting at around twenty-two years of age, three years earlier than men. Over two thirds of her sample of women had been on a diet before the end of their teen years, but only five percent before the age of thirteen. Men rarely started dieting before their mid-twenties.

Wiseman et.al. (1992), Silverstein et.al. (1986), and Garner et.al. (1980) have all analysed the contents of many popular women's magazines in an attempt to determine the cosmetic behaviour of Western women

concerning body image. Their analyses indicate an overall increase in emphasis on weight reduction paralleling the decline in actual weights of leading icons of female attractiveness. Fallon's (1994) review of some of the more recent research in this area lead him to believe that recently exercise articles and advertisements have surpassed the frequency with which diet articles and advertisements appear in these magazines. However, Fallon (1994) stipulates that across both categories of advertisement, reduction and control of hip and buttock dimensions was emphasised. The key message conveyed by these articles and advertisements is that a lighter, smoother and more compact body profile is desirable. Fallon (1994) recorded no equivalent trend for males in male targeted magazines.

led = leading behaviour
lead = metal plus verb

It appears that the Western idealisation of increasingly slimmer women is culturally exceptional, and a recent and dramatic turn around from the traditional preference of early Pleistocene hominoidae and Western culture up until the turn of the century. Anthropological reports offer many detailed impressions of the standard of female beauty in a number of diverse cultures. Singh (1993a) found systematic comparisons of these descriptions mythologically problematic. This was primarily due to the diversity of measurements used and the vast ontogenetic variability across and within cultures.

Anderson, Crawford, Nadeau, and Lindberg (1992) compared the female body shapes seen as most attractive for many of the cultures reported in the *Standard Cross Cultural Sample*. This data source was derived from *The Human Relations Area File* and was created specifically for cross cultural comparisons. They used only those societies for which the female body type considered most attractive could be coded. They found that fifty cultures out of the sixty-two useable cases, considered body fat attractive in women. Of the fifty, twenty three preferred women of moderate body fat, twenty seven preferred plump women.

Furnham and Baguma (1994) were in a position to compare British and Ugandan perception of female attractiveness and health as a function of body adiposity. Their sample of Ugandan and British students displayed similar preferences, both of which reflected the popular Western media images of the late twentieth century. However, the Ugandan subjects did tend to rate extremely obese stimulus figures as more attractive and healthier than the British students. Furnham and Baguma's (1994) findings suggest that Ugandans have a similar standard of female physical attractiveness, yet have less negative attitude to high levels of female body fat than their Western counterparts. However, the degree to which these results reflect cultural differences is unclear, due to the profound influence modern communications have enabled Western culture to exert on this Ugandan group.

Beller (1977) concludes that 18,000 to 25,000 years ago, during the period known as the Stone age, female body fat was idealised. Figurines dating back to the stone age have been discovered by archaeologists in Russian, Siderian, and European soils. Despite their varied geographical location they were all very plump. Beller (1977) points out that during this period artists were working within a highly realistic convention, however, as readily available sources of fats, such as carbohydrates and protein, were ecologically limited factors in the Pleistocene diet, these figures are unlikely to be modelled on the typical female form. Beller (1977) argues that this suggests they had attributes rare, though clearly valued in the eyes of the primitive sculptures.

It is the preserved paintings of pre-twentieth century Western artists that suggests female body fat was valued in Western culture up until the turn of the century. Polivey et.al. (1986) describe classical Greek and Renaissance artistic renditions of cult figures of beauty such as *Venus* and *Aphrodite*, as typically depicting plump and curvaceous figures. Botticelli's

'The Birth of Venus' provides an apt example. Botticelli depicts Venus as a youthful, although amply fleshed woman (Figure 1.1).

The efforts of so many contemporary Western women to reduce their weight in order to mimic the current ideal of female attractiveness are likely to be thwarted by physiological and behavioural mechanisms evolved to store surplus calories as fat and by the abundant and sedentary lifestyle typical in Western society (Chapter Three, pg. 67 and 76). The acute physiological conflict created by deliberate weight control suggests that something other than biological factors are responsible for the idealisation of thin women in Western culture. Consequently, the current ideal tends to be viewed as a purely social construction.

Research conducted by Stice and Shaw (1994) illustrates how the thin ideal portrayed in the media can contribute to eating pathology among females. They demonstrated through experimental manipulation that exposure to a thin ideal presented in a media context increased body dissatisfaction, feelings of shame, depression, and loss of self esteem in women. These negative affective states have been shown as having a direct influence on eating behaviour and the manifestations of eating pathology.

However, it is not justifiable to hold the media accountable as the cause of the idealisation of thin women in Western society. This view endows aspects of the media, such as advertising, with powers it does not possess. Holbrook (1987) clearly states that while advertising does have the power to influence consumer behaviour, it cannot create it. For example, exposure to product advertising can influence the consumer to select the endorsed product, but it cannot create a consumer need for the product. This suggests that while the media have the ability to perpetuate the contemporary Western ideal, they do not have the capacity to create it.

media is a plural noun they do

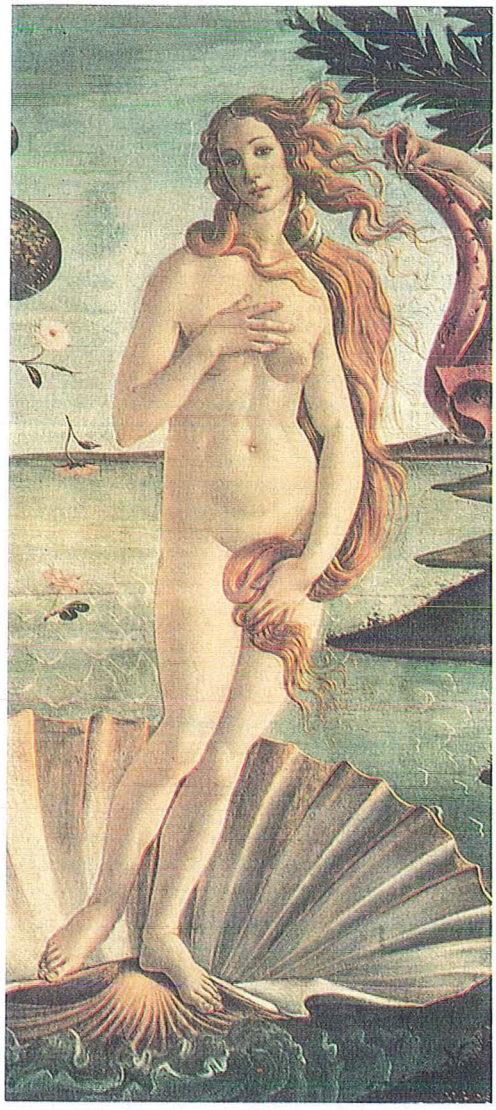

Figure 1.1: Sandro Botticelli (1484-86), *'The Birth of Venus'*. Canvas in Uffizi Gallery, Florence.

Other social factors have been drawn upon to provide explanations for the thin ideal which recognise only social causation. For example Malson (1995), Hesse-Biber (1991) and some of the theorists cited in Polivey et.al. (1986). In all these arguments the social theorists draw upon the existence of values arbitrarily. The lack of explanation for the origins of causal factors utilised in argument is a metatheoretical problem indicative to **proximal** explanations of human behaviour not grounded in an **ultimate** theoretical framework. Rushton (1990) points out that while proximate explanations emphasise the local environmental, physiological and psychological factors involved, ultimate explanations consider a larger conceptual time space and attempt to trace a line from the fundamentals of existence to nature and its manifestations. To circumvent this one either must develop an ultimate explanation for the phenomena in question, or an ultimate framework for the proximal explanation.

1.1. The Evolutionary Program

The evolutionary program provides an ultimate explanation of human behaviour. The recognised founder of evolutionary theory has become a house hold name, Charles Darwin. Darwin argued in *"The Origin of the Species by Means of Natural Selection"* (1859, in Ruse 1985) that all living organisms, past and present, evolved from the most basic form of life through a process of **natural selection**. In modern translation, an organism with a certain characteristic or disposition will dominate in a species if the genes or allets responsible give their possessors an adaptive advantage. An adaptation is any structure, physiological process, or behavioural mechanism that increases an organism's chances of survival and/or reproduction in comparison with other members of the same species or habitat.

The evolutionary doctrine has had a profound influence in psychology. *"It ushered in the study of individual differences with an emphasis on mental testing; it provided the rationale for the field of comparative psychology and made legitimate the inferences from animal work to human; it stressed the concepts of adaptation, function and purpose which became dominant in American and European psychology during the twentieth century; it focused attention on the role of genetic material which eventually culminated in the discipline of behavioural genetics; and finally by stressing inheritance it profoundly influenced the field of developmental psychology"* (Reber 1985, pg 254).

1.2. Evolution of the Human Species

Wilson (1975) recognises that although many similarities are apparent between humans and other social animals, humans are unique in the complexity of their culture and its influence on their behaviour. The definition of culture is problematic and, as Lumsden and Wilson (1985) show, it varies across disciplines. Reber (1985) loosely defined culture as a system of shared beliefs and information that codes the manner in which its members interact with their social and physical environment. Culture is learned and modified by each successive member and generation, its history and environment.

The chimpanzee is the primate which has a learning capacity closer in extent to humans than any other animal. Symons (1979) explains that in their natural environment chimpanzees carefully observe other chimpanzees, especially their mothers, learning context specific tool-using skills through imitation and successive trials. As a result, groups of chimpanzees from different territories exhibit variation in the manner and function which they use tools. Symons (1979) argues that this is analogous, although considerably less complex, to culture and its diversification in humans.

The capacity to learn and its influence on an organism's behaviour is conceivable within the Darwinian evolutionary framework. For an organism exposed to a variable environment that frequently changes from generation to generation it is adaptive for individuals to be able to learn from their surroundings in order to adjust rapidly to inevitable new circumstances. Lumsden and Wilson (1983) argue that unlike natural selection, learning provides a responsive plasticity to novel situations that does not require successive genetic variants. The human's unprecedented

capacity to learn and to act upon this knowledge is matched only by their unprecedented diversity of habitat. These unique characteristics appear to be a direct result of one another.

Blurton-Jones (1990) argues that it is in modern *Homo sapiens* that the existence of culture becomes problematic for the traditional functionalist evolutionary framework. In many cultures humans practice behaviours that seem to offer no adaptive or reproductive advantage. Among them are large scale altruism, beliefs in a life after death, adoption of non-kin, and pastimes that consume wealth and resources without apparent fitness gain.

Evolutionary explanations for the development of contemporary cultural phenomena are complicated. First, as Durham (1991) illustrates, the linkages between genes and culture are remote, indirect, multiple and complex. Secondly, as Wilson (1975) is forced to admit, much of our behaviour is species-specific; a product of a rich culture unique to humans. There is no other fully cultural species with which humans can be compared.

The problem which modern human culture presents for evolutionary theory has given rise to varied thoughts on the gene-culture interaction and its evolution in humans. Two explanations have dominated **Evolutionary Psychology** and **Dual Inheritance Theory**. The critical philosophy of these perspectives is presented in the following two sections. The differences between them, and their implications concerning the conception of human nature are examined in more detail in Chapter Five (pg. 112-118).

(good editing)

1.2.1. Evolutionary Psychology

Symons (1979) argues that large brained hominids with advanced social and tool skills have existed for approximately one million years. For over ninety nine percent of this period humans lived in small nomadic

groups without domesticated plants or animals. Evolutionary Psychologists like Cosmides and Tooby (1987) and Symons (1979) argue that insufficient time has elapsed for natural selection to shape human genetics according to the social and ecological conditions of an agricultural or industrial habitat. Therefore, humans have evolved according to the social and ecological conditions that confronted the Pleistocene hunter-gather way of life. Symons (1979) refers to this as the **environment of evolutionary adaptiveness (EEA).** Within this perspective much of the behaviour evident in modern man is not adaptive because the conditions imposed by industrial society are vastly different to those of a hunter-gatherer way of life.

Cosmides and Tooby (1987) argue that Pleistocene hominids evolved **domain specific mechanisms** designed to interpret the environment of our ancestors to meet evolutionary adaptive goals (survival and reproduction) in frequently encountered conditions. They defined these mechanisms as sets of complex cognitive inquisition, and discussion making functional programs that guide human behaviour in concrete specific situations. As opposed to Dual Inheritance theory, Cosmides and Tooby (1987) claim that domain general mechanisms are not adaptive as they are prone to error, and since they provide no model of which prescribes the constitution of an error, deleterious behaviour will tend to pervade within such a system. This they term as the ***framing problem.*** They discussed research in artificial intelligence that shows how trial and error is a good procedure for learning only if the system already has a well specified model of what is likely to be a correct interpretation and includes a definition of what constitute an error.

Tooby and Cosmides (1992) believe culture is the product of the individual learning about the behaviour of others, from the people around us, based on evolved domain specific mechanisms. They argue that culture is richly variable because it is generated by an intricate, contingent set of these functional programs that use and process information from the organism's environment.

Blurton-Jones (1990) and Cosmides and Tooby (1987) agree that for the Evolutionary Psychologist to explain human behaviour, three tasks lie ahead. First, they must understand the evolutionally relevant conditions our Pleistocene ancestors faced. Secondly, they must establish what cognitive mechanisms evolved that maximised fitness under these conditions. Symons (1979) proposed one method in which this could be done... *"If humans exhibit relatively uniform dispositions under a wide range of environmental conditions these dispositions probably were uniformly adaptive among our Pleistocene ancestors and hence develop in a relatively stereotyped manner"* (Ch.2 pg. 71). Finally, they must document the influence of these antiquated mechanisms on contemporary society.

1.2.2. Dual Inheritance

Generally speaking Dual Inheritance sees genes and culture as evolving mostly independently. Dual Inheritance theorists, unlike Evolutionary Psychologists, are not unanimous on the working of their model. The main area of contention is the degree to which genetic and cultural evolution are independent from one another. Durham (1991) and Lumsden and Wilson (1985) represent the two opposing positions on this issue.

Durham (1991) argues that genes and culture evolve predominantly autonomously. Durham (1991) sees human genetic evolution as guided by natural selection. He claims that for culture the variable unit of transmission is the **meme**. Durham (1991) defines this as any kind, amount, and configuration of information in culture, that shows both variation and coherent transmission. Its variation is determined by the effects of circumstance, history, and the nature of the prevailing cultural structure.

He believes that cultures evolve according to the rate of transmission of a meme within the existing cultural system: Existing cultural values and structures guide the adoption of memes, and are constrained by the particular meme's suitability for replication. This conception of cultural evolution endows it with the capacity for self directed change. Durham (1991) states that it is because human culture is capable of self directed change and as this change is not governed by the constraints of genetic evolution, that non-adaptive behaviour can arise and pervade.

Within this framework, Durham states that to study human behaviour researchers need to consider each system separately, heredity as a product of natural selection and culture as the product of context, history and socialisation processes. Durham (1991) believes that the interaction of genetic and cultural evolution occurs where the **inclusive fitness** of the individual is concerned. Inclusive fitness refers to an individual's total fitness including personal reproductive success and the reproductive success of biological relatives. He argues that this is because the inclusive fitness of an individual is the standard of adaptation in social settings: It is through the inclusive fitness of the individual that cultural mechanisms frequently contribute to gene survival and replication differentials.

Lumsden and Wilson (1985, 1983) also hold that genes and culture evolve in parallel; genes through natural selection, and culture by drift or unspecified rules of internal consistency. However, Lumsden and Wilson (1985) believe genes play a more, than Durham (1991), influential part in cultural evolution. They argue that an amalgamation of genetic evolution and cultural evolution is adaptive for complex organisms which encounter a frequently changing environment.

They agree with Cosmides and Tooby (1987) that although learning guided by domain general mechanisms may endow an organism with greater flexibility, the errors that can be made are costly, and non-adaptive

behaviours are likely to pervade. They claim however that cultural evolution coupled with a genetic disposition for the prompt learning of certain fundamental survival behaviours (e.g. dietary preferences, the development of adult sexual behaviour) is at a selective advantage. In terms of the artificial intelligence analogy put by Cosmides and Tooby (1987), it is these genetically determined dispositions that provide the model needed to avoid the *framing problem.* These genetically determined dispositions Lumsden and Wilson (1983) term **epigenetic rules.** They give some possible examples of these rules, ranging from the more basic (e.g. avoidance of incest and death) to those believed to mediate more complex mental activities (e.g. colour categorisation and cognitive processing).

Within Lumsden and Wilson's (1985) model of human nature, culture is guided by epigenetic rules that facilitate the adoption of behaviours in terms of evolutionary success. In turn these genetic rules have evolved over a period where their guidance has enhanced the behaviour of the individual for his/her evolutionary advantage across a variety of habitats. Lumsden and Wilson (1983) suggest that genes and culture typically interact as in the following example: "*...the epigenetic rule that direct the developing mind to avoid incest lead to cultural patterns prohibiting incest; persons who conform to the aversion leave more offspring; as a result genes responsible in the developing of incest avoidance remain at a high level in the population* "(Lumsden and Wilson 1983, pg. 355). Lumsden and Wilson (1985) propose that to understand modern human behaviour, one needs to extrapolate the possible epigenetic rules and scrutinise their interaction with modern cultural phenomena.

1.3. Aim and Structure

The aim of this thesis is to present and evaluate an evolutionary explanation for the idealisation of female slenderness within contemporary Western culture. It describes how this ideal is a manifestation of a male sexual preference for youth and a female deceptive reproductive strategy. The research also illustrates how the evolutionary program can be used to better understand contemporary human behaviour, and generate testable hypothesis.

Chapter Two has been written so that a line can be traced from the origins of human sexual behaviour to its manifestation in modern hominids. Part One is an introduction to the concepts and principles developed within the evolutionary program to explain sexual selection and the reproductive strategies adopted in animals. Part Two demonstrates how these principles have been used to explain human sexual preferences and reproductive strategies. In both these sections particular emphasis is placed on the concepts and principles that are implicated in the theory proposed in this thesis.

Chapter Three starts with a discussion of the biological functions and reproductive advantages of body fat. It is due to these functions and reproductive advantages that the idealisation of female slenderness presents an apparent paradox for the evolutionary program. The second section of this chapter assesses the socioecological and biocultural explanations which Anderson et.al. (1992) and Smuts (1992) propose. Succeeding this an alternative explanation is proposed and its validity discussed.

Chapter Four documents the empirical study designed and conducted to test this theory and its findings.

In Chapter Five the findings are discussed and the broader implications this study has for the conception of human evolution and nature are addressed.

Sexual Selection and Reproductive Strategies

Part One

Evolutionary Concepts and Principles

The Blue Peacock (*Pavo cristatus*) is one of the most commonly used examples of sexual selection and its sometimes dramatic results (e.g. Gould and Gould 1989). Both sexes exhibit the functional differences in primary sexual characteristics common in avian species. However, it is the secondary sexual characteristics of the male and female Blue Peacock which, once mature, differ the most. The peahen is a musty brown all over, and short feathered. Conversely the peacock, on his larger body carries most spectacular plumage. He has exceptionally long tail feathers which he can spread behind a bright blue neck as an enormous fan of about two hundred iridescent feathers, each adorned with an eye pattern (Figure 2.1.) (e.g. Perrins and Middleton 1985). This fantastical structure he rarely displays outside courtship (Petrie, Halliday and Sanders 1991).

The peacock's tail at first appears to have no adaptive function. This elaborate structure is costly, its aerodynamics are awkward and its brightness conspicuous. In the *Origin of Species by Means of Natural Selection,* Darwin (1859 in Ruse 1985) argued that the main mechanism of evolution was natural selection, but he recognised secondary mechanisms. One of these mechanisms was **sexual selection**, which was developed at length by Darwin in *The Descent of Man and Selection in Relation to Sex* (1871 in Wilson 1975). This process he proposed explains the existence of the elaborate and diomorphic secondary sexual characteristics evident in the Blue Peacock and many other sexual species.

Figure 2.1: The plumage display of a male Blue Peacock (*Pavo Cristatus*).

As natural selection is a function of the struggle for survival, Darwin's concept of sexual selection is a function of the struggle to reproduce. Sexual selection results from the differential abilities of individuals to acquire mates and the significant reproductive advantages this entails. Darwin identified two varieties of sexual selection: **Intrasexual selection** which is the result of direct competition between members of the same sex for access to a mate and **Intersexual** or **epigamic selection** which is the influence one sex exerts on the other's development through preferential mating . The first form of selection commonly leads to the development of greater strength or weapons to use against other members of the same sex to gain dominance over the resources necessary for reproduction or access to potential mates. The second, typically results in the development of some kind of ornamentation that functions as a sexual attractent.

The difference in body size between male and female peafowl illustrates how intrasexual selection can operate in a species. Petrie et.al. (1991) found that some peacock territories provide better mating opportunities than others. They found that the larger males in their sample were capable of acquiring and defending the best territorial sights due to their greater strength and stamina. These males were more likely to mate successfully, and tended to mate more frequently than males ousted to less suitable territories. Therefore, as the larger male peacocks have the greater reproductive success it is their genes that dominate in the male population gene pool.

Leger (1992) argues that in epigamic selection, the characteristics preferred are those that are advantageous to have in a mate. The particular characteristics selected vary from species to species. This is because the selection conditions for differing species also tend to vary. Low (1979) argues that the dramatic ornamentation observable in the males of many species serves to advertise his quality as a mate to the selecting sex. To support Low's (1979) hypothesis, Sigmand (1993) explains that the

elaborate plumage of the male peacock is a product of epigamic selection as it serves as a signal of the male's **phenotypic** quality, to the peahen. The phenotype is the observable properties of an organism as they have developed under the combined influence of the genetic constitution of the individual and the effects of environmental factors (Ruse 1985).

Sigmand (1993) argues that most animal species are permanently threatened by illness due to parasites. The extremely rapid breeding cycle of parasitic organisms means they can adapt at a faster rate than their hosts and counteract the defence mechanism the hosts may evolve. He claims it is not in the interests of the peahen to develop a specific sensor for detecting the presence of a particular disease or parasite in a potential mate as there are so many variations and they rapidly and continually adjust to the changing conditions. Sigmand (1993) observes that the health of fowl is saliently reflected in the state of their plumage. He suggests that peahens select mates on the basis of the condition of their plumage as this reflects physical health. This can be judged best if the tail plumes are exaggerated like the peacock's. To support his argument Sigmand (1993) cited research that shows that the more an avian species tends to suffer from parasites the more elaborate the male's plumage. This, he believes, explains why it tends to be tropical avian species with the most dramatic plumage.

Not all evolutionary theorists including Sigmand (1993), believe, considering the serious survival costs involved, that advertising alone can account for the ornamental flamboyance that has evolved in many species. Fisher (1930 in Yoshimara 1992) argues that the extreme ornamentation evident in many species " *.....evolved as the result of a* ***'runaway process'*** *due to the positive feedback on male choice by means of future benefits of producing attractive offspring"* (in Yoshimara 1992, pg. 64). Sigmand (1993) argues that the exaggerated length of the male Blue Peacock's tail owes its costly flamboyance to the effects of positive feedback: The

peahen's advantage in choosing males with increasingly flamboyant tails consists of having her sons inherit the sex appeal of their fathers.

2.1. Parental Investment

A dominant pattern of sexual selection is evident across species, one of male intrasexual competition and female epigamic choice (e.g. Ruse 1985). Darwin's concept of sexual selection has proved insufficient to explain the existence of this robust pattern or determine its exemptions. It was not until 1948, eighty-nine years after Darwin first published his theory of sexual selection, that new technology enabled a key advance to be made that later inspired an explanation for this pattern.

The break-through was a series of experiments conducted by A.J. Bateman (1948 in Trivers 1985) using *Drosophila melanogaster*. In each experiment Batman introduced five male flies to five virgin females in a bottle and left them for a sufficient period to allow them to reproduce. The flies he used carried chromosomal markers enabling him to distinguish the offspring of individual flies. In Batman's experiments only four percent of the females failed to reproduce, in contrast twenty one percent of the males failed. Batman observed that all the males flies repeatedly attempted to mate, and the higher their success rate, the more surviving offspring they produced. Most of the females that mated only did so once or twice, but all, including the four percent that did not mate, were repeatedly courted.

It was not until 1972 that Robert Trivers, building on Bateman's findings, proposed a general theory to account for the different **reproductive strategies** adopted by males and females. Reproductive strategies are the idiosyncratic behavioural mechanisms designed to maximise the individual's reproductive success, given its particular phenotype (Volpe 1983). This includes intrasexual and intersexual selection. Trivers (1985) argues that the reproductive strategies adopted are

determined by the **parental investment** each sex makes in its offspring. He defines parental investment as.. "*anything done for the offspring that increases its chances of survival while decreasing the parents ability to produce additional offspring*" (Trivers 1985, pg. 207).

Bateman (1948 in Trivers 1985) observes that the female fly produces a larger and more costly gamete than the male. Trivers (1985) argues that if the male and the female of a species differ in their parental investment, the sex with the greater investment will become a limited resource. He suggests that the fact that the limited sex is more assured of finding a mate explains why more of the females in Bateman's experiment found a mate than the males. Reproductive variance was highest for the male flies in Bateman's experiment because only a select few of the lesser investing sex are given the opportunity to mate.

Trivers (1985) argues that, in all species, intersexual selection will tend to evolve in the greater investing sex as it increases reproductive success. As a sex invests more in its offspring, it decreases its capacity to invest in subsequent offspring, thereby making it more advantageous to restrict mating to a partner who has qualities that are advantageous for reproduction. Conversely, Trivers claims that, in all species, intrasexual selection is more likely to evolve in the lesser investing sex. To increase reproductive success, the less a sex invests in its offspring, the more it must outcompete with other members of the same sex for limited access to potential mates.

All sexual species are anisogamous (Ruse 1985). As the male provides the smaller gamete, male intrasexual competition and female epigamic choice are the most commonly observed patterns of sexual selection. However, the sex cell is not the only means by which an organism can invest in its offspring. Trivers (1985) states that parental investment includes anything done for the offspring that increases its chances of

survival. Such investment includes the cost of producing the sex cell, in the form of time, energy, or risk expended or experienced by the parent on behalf of the offspring. Provision of resources, parental care and courting behaviour are common forms of additional male parental investment. There are species where the typical pattern of sexual selection is reversed because the male invests more in the offspring than the female (e.g. Petrie 1983).

Pipefish Seahorses *(Sythidae)* include several species that appear to have reversed sex roles. In each case the male incubates the egg in a pouch located over his stomach, similar to that of a kangaroo. The length of time males carry eggs compared to the time it takes for females to produce a new batch is unknown (Rosenqvist 1991). However, Trivers (1985) argues that as the female produces a larger batch of eggs than the male could carry, this suggests that reproductive success for females is limited by access to males. He claims that, as predicted by parental investment theory, the females are more active in courtship, and are more brightly coloured than the males. As colouration correlates with motivation to breed (the brighter courts with the greater intensity) this suggests that the females use colouration as a sexual attractant, and that males prefer brightly coloured females.

2.2. Mating Systems

The mating system adopted by a species is a useful index of the relative degree to which the male and female invest in their offspring. Mating systems of species have been classified into two types: **Polygamy** and **Monogamy,** and each of these has been broken down into several distinct categories. The following description of this classification system is based largely on Leger (1992).

2.2.1. Polygamy

Polygamy, in the broadest sense, covers any form of mating system that involves multiple sexual partners. The variations of this classification that have been observed can be divided into two distinct categories: **Polygyny** and **Polyandry**.

a) Polygyny

Polygyny is the mating system in which one male mates with two or more females. Within this system males typically invest less in their offspring than females do. There are three types of polygyny, these can be distinguished by the way in which the male excludes other male's access to reproductive females.

•Resource Defence Polygyny: This mating system is specific to species that inhabit environments where the resources that are necessary for or assist reproduction are unevenly distributed and defendable. The dominant males often control access to these resources by aggressive means.

They offer access only to females in exchange for mating privileges. This is the mating system apparent in the Blue Peacock species *(Pava cristatus)* (Petrie et.al. 1991) .

•Harem Polygyny: In harem polygynous species, the females live together as groups for various survival reasons. The strongest male dominates the group and restricts the access of other males by aggressive means. This type of mating system is particularly common in mammals.

•Male Dominance Polygyny: This category is similar to harem polygyny, but differs in the respect that subordinate males are not totally excluded from mating with females in the group. The most dominant males do, however, secure more matings at the expense of subordinates. A good example of a male dominance polygynous species is the African Lion *(Pathera leo massaica)* (Rundnai 1973).

b) Polyandry

Polyandrous females utilise the reproductive output of more than one male. The ways in which other females are excluded from access to males are similar to those used by males in polygyny. Polyandry is very rare, and appears to occur only in a few bird species. It is believed to have evolved in species where the ability to lay replacement eggs is highly favoured, due to the common loss of eggs or offspring to predators. Ordinarily the females do little for their young, and spend their time feeding and resting to minimise the period before they are able to propagate a new clutch. Male parental investment is high in this type of mating system: the males typically mate exclusively and spend more time than the female nurturing their offspring.

2.2.2. Monogamy

Monogamy is the mating system in which the male and the female of the species **pair-bond** exclusively. A pair-bond is the close and long-lasting association formed between a male and female for the cooperative rearing of their young (Wilson 1975). The pair-bond can last for a season or in some cases for a life time. Leger (1992) claims that it is common for researchers to emphasise that no single characteristic defines monogamy, but that the following characteristics tend to be present in monogamous species: The female and the male typically reside together in the same territorial range. Exclusive mating between the paired couple is the typical condition. There is usually some form of bi-parietal care for the offspring. Monogamous species are categorised into **Facultative** and **Obligate** according to the reproductive options available to them.

a) Facultative

Kleiman (1981) states that in a facultative monogamous species monogamy only exists in some ecological conditions. The Elephant Shrew *(Elephantutus rufescens)* exhibits the typical behavioural characteristics of a facultative monogamous species. Although they do pair-bond, the relationship is typically weak, and behaviour towards one another is often aggressive. Copulation outside of the pair-bond is frequently observed. Sexual selection resembles that of polygynous species, one of female epigamic choice and male intrasexual competition.

b) Obligate

Kleiman (1981) explains that in obligate monogamy the whole species is restricted to this particular mating system because the female is unable to reproduce without a male's assistance, irrelevant of ecology. Obligate monogamous species, such as the Lion Tamarin *(Leonlopithecus rosalia)*

interact in a very different way to facultative monogamous species. Once mated, their activities become completely synchronised, they develop an exclusive and intensely strong bond to one another. Their behaviour toward one another is primarily affiliatative. Copulation outside of the pair-bond is extremely rare. In some species, female intrasexual competition exceeds that of males, but usually, as is the case in Lion Tamarins, there is little difference.

Leger (1992) admits the application of the mating system classification scheme he describes is complicated. Many species show seasonally or ecologically determined shifts in the mating system adopted, and exhibit sex specific differences in reproductive strategies. This creates the need for extended observation and an understanding of the male and female reproductive strategies before a particular species can be classified.

Well done

2.3. Deception

Adroit and insidious mechanisms designed to deceive the opposite sex for individual reproductive gain pervade the animal kingdom. Gould and Gould (1989), after reviewing the extent and nature of deceptive reproductive strategies in animals, were lead to concluded that ...*"The pragmatic strategies that have evolved under pressure of sexual selection exploit nearly every conceivable opportunity to cut corners, to do by stealth what would cost more or pay less to do 'honestly"* (pg. 239). **Desertion** and **Cuckoldry** are the two most commonly observed deceptive reproductive strategies in vertebrates.

2.3.1. Desertion

Desertion, as a deceptive reproductive strategy, has evolved in many monogamous species. Trivers (1985) argues that desertion is advantageous in two ways: Firstly, the deserter may find better opportunities for breeding elsewhere. Secondly, leaving the partner with the duties of raising the offspring on its own, frees the deserter to invest in additional offspring. The former is only adaptive if their is the opportunity available to find a new mate outside of the bond. The later is only advantageous in species were the male and female differ in the rates they invest parental care in their offspring. Trivers (1985) argues that the advantage to one member of the pair in deserting its mate will increase, the lower the relative accumulated investment that that member is expected to provide. If a male's parental investment is not expected to rise as much after copulation as the female's, she is more likely to be able to raise the young unassisted. In such a case the

advantages for the male of desertion are high, as the time spent with his existing partner may be better spent investing in additional offspring.

Gould and Gould (1989) illustrate desertion and its substantial reproductive advantages in the example of the Pied Flycatcher. The male establishes and guards a territory with a suitable nest sight. Then he displays to attract a female. Once she has inspected the property and if she finds it satisfactory, she will mate with him. She incubates the eggs and typically the male helps feed her and the young once they have hatched. A quarter of successfully mated male Pied Flycatchers temporarily abandon their first mate once she has laid her eggs. He stakes out a new territory, and attempts to copulate with a new female. If successful, and after the new mate has laid her clutch he again desserts, but this time returns to his first mate and assists with the rearing of the offspring. A monogamous pair will ordinarily produce around five surviving fledglings, a deserted female only three. Therefore, a monogamous male is likely to produce five fledglings, a deserter eight.

2.3.2. Cuckoldry

Trivers (1985) observes that attempting to raise the young by relying on its own resources is not the only option for a deserted mate in many species. Two other possible options have been adopted. In a few species the organism will desert their offspring or eggs and attempt to breed again with another mate. This is costly, as the organism loses its initial investment, so it tends only to occur in species where initial investment is low for both sexes, or breeding was unsuccessful. Alternatively, in some species, the deserted mate cuckolds a new mate, inducing another partner to help raise its offspring. Trivers argues that to do this the deserted partner deceives the new mate into believing the offspring are its own.

Trivers (1985) observes that, in many monogamous bird species, the female will voluntarily copulate outside an established pair-bond. He argues that this behaviour is adaptive in species where the female choice for phenotypic quality in a mate, is at variance with female choice for investment. In such species, because either male parental investment is at odds with phenotypic quality or male investment is at a premium, a female may sequester the investment of a genetically poor male. By cuckoldry she can mate with a phenotypically superior male and still retain the advantages of male parental investment. Trivers admits that little is known about female sexual selection for superior phenotype in monogamous species.

Trivers (1985) argues that the incidence of cuckoldry in many species has generated strong adaptations in male behaviour. This is especially the case in species where the foetus develops within the mothers body. The female can be sure the young she bears belong to her, whereas the male can not be so certain. Trivers (1985) concludes that males in vertebrate species have evolved two different ways of guarding against cuckoldry. The first is to guard the female to insure no other males have or can gain sexual access. One possible manifestation of this strategy is the territorial guarding behaviour common in bird species such as the Black Backed Gull *(Larus fuscus)*. Secondly, the male copulates repeatedly with his mate. This method has evolved due to the selection advantage of **sperm competition**.

Barker and Bellis (1995) define sperm competition as the competition between sperm within the uterus from different males for fertilisation of the egg(s) produced by a single female. They conclude that sperm competition in vertebrates usually takes two forms. **a) Ejaculate polymorphism**: The ejaculate consists of sperm morphs designed to serve different functions. Most are designed to seek out the egg(s) and upon arrival fertilise them as quickly as possible. Some function to identify and destroy or prevent sperm from a different male reaching the egg by incapacitating foreign sperm using the highly destructive proteolytic enzymes produced by their acrosomal

complex. **b) Superabundant sperm production**: The male produces more sperm than is necessary for fertilisation because the more semen the male produces the greater the chance that his sperm will overwhelm the sperm from another male.

Part Two.

Human Sexual Preferences and Strategies

Tiefer (1978) concluded that research on human sexual behaviour is limited and fraught with methological difficulties. She found that most often these problems were caused by the normal privacy of the behaviour, the possibility of distortion when relying on self reports, (the most common method used to tap sexual attitudes and behaviour) and the investigator's personal value systems leading to biases in their definitions and in the interpretation of their data. However, from the available data, comparative analysis and the employment of evolutionary concepts and principles, evolutionary theorists have generated and tested many explanations and predictions for human *(Homo sapiens sapiens)* sexual preferences and reproductive strategies.

2.4. Parental Investment

The human female, once fertilised, at the minimum faces the prospect of a nine month pregnancy followed by a period of infertility succeeding parturition. The duration of this period varies as a function of diet, lactation and age (Blurton-Jones 1989). This period is typically spent nursing the newborn as females alone have the specialised structures from which a newborn infant can suckle. (e.g. Volpe 1983). This is no longer a necessity today, wet nursing and the recent practice of bottle feeding the infant with cow's milk provide alternatives. Conception does not decrease the human male's ability to produce additional offspring as much as it does the female. He is capable of reproducing as soon as his sperm store is replenished (Volpe 1983). It is estimated that the human male typically produces eighty four million sperm a day if Mongoloid, and one hundred and eighty five to two hundred and fifty-three million per day if Caucasoid (Short 1984, in Baker and Bellis 1995). A minimum of eighty million sperm per ejaculate is believed to be necessary for fertility (Volpe 1983). These sex differences in physiological investment suggests that the human female is the limiting sex.

However, there is much more to be considered pertaining to parental investment. Parental investment is anything done for the offspring that increase their chances of survival while decreasing the parent's ability to produce additional offspring (Trivers 1985). To fully understand the reproductive behaviour of women and men, the extent to which the human male invests in his offspring, beyond physiological necessity, must be ascertained. This can be determined by establishing the mating system adopted.

2.5. Mating System

Gould and Gould (1989) claimed that eighty-four percent of known human cultures practice polygyny. Of those remaining, sixteen percent practice monogamy, and two percent are polyandrous. Leger (1992) points out how this picture is further complicated. Firstly, no human society exclusively restricts itself to one mating system, and many shift with seasonal and environmental change. Secondly, it appears that whatever the society, all have ceremonies and/or other practices that publicly announce pair-bonds between males and females. Thirdly, although monogamy is adopted in only a minority of cultures, those cultures in which it is adopted are the most dominant and wide spread, e.g. Europe, America, Russia, China, and Japan.

Leger (1992) suggests that establishing the mating system practiced in our ancestors will assist in explaining contemporary human sexual behaviour. He found that this could not be deduced from the available fossil evidence on humans, and there exist no historical records from so far back in time. Therefore to do this, Leger (1992) found it necessary to compare the attributes known to correlate with particular mating systems in other animals, and inferred from these the nature of humans. There exist many such correlates, however Leger (1992) recognises only three as applicable to humans. This is because they are either impossible or very difficult to measure in humans, or their relationship is complicated by many confounding variables. The three correlates he used were sex differences in body size, maturation, and reproductive variance. In the succeeding sections each of these correlates are considered in turn and additional research is discussed to assess Leger's (1992) conclusions.

a) Body Size: Leger (1992) claims that in monogamous species males and females are typically similar in body size. The more polygynous the species, the larger the male tends to be relative to the female because of the greater influence male intrasexual competition has on reproductive success. Leger (1992) recognises that once adult size is established, the human male is the larger and more physically powerful sex. Tanner (1973) explains that the human male is, on average, thirty percent larger than the female, although this varies slightly across cultures. He also points out that males develop more muscle mass, and larger lungs and heart in relation to their body size than their female counterparts. In addition, they develop a greater carrying capacity for oxygen in the blood and a greater capacity to neutralise the chemical waste products of muscular exercises. These differences combine to give the typical male a body with a superior ability to cope with high physical demands, which is advantageous in competition. Burd (1986) argues that these differences have survived from our earliest ancestors, for similar body size dimorphism is evident in the existing remains of Mio-Pliocean hominids, and early hominoidae. *Australopithecus afarensis* exhibits the most pronounced dimorphism out of any hominoidae.

The differences in body size between the sexes for humans is closest to that of chimpanzees and baboons (both highly polygamous species), and similar to many pongid species. The difference for chimpanzees is closer to twenty percent, while it is fifty percent for baboons, and almost one hundred percent for gorillas (Gould and Gould 1989). However, Gould and Gould (1989) concluded that the relative size difference between human males and females is normal for both monogamous and polygamous species in which display or resources are an important aspect of male selection.

b) Maturation Rate: Leger (1992) points out that in monogamous species, males and females typically attain sexual maturity at approximately the same age. He argues that this is to assure mating synchrony. In polygynous species, males tend to mature later than females. Leger (1992)

maintains that polygynous males typically take longer because of their larger body size. Leger (1992), Kaluger and Kaluger (1979) and Tanner (1973) conclude that although maturation shows dramatic individual and cultural differences, sexually dimorphic differences are clearly evident in humans. Human males mature later than females, typically reaching puberty about two years behind them. In the female, adult growth and physical sexual development is typically established between the ages of eighteen and nineteen. Whereas for the male, physical growth and sexual development is not fully established until in the early twenties. Research is needed that compares the relative degree of sexual dimorphism in maturation evident in humans, with that of other species. Then the mating system adopted by human ancestors can be more confidently inferred from species with similar sex differences in maturation rates.

c) Reproductive Variance: Leger (1992) states that the more polygynous the species, the more the males' reproductive variance will exceed that of the female sex. Leger (1992) examined Chamie and Nsuly's (1981) international study of remarriage. He concludes that although most of the cultures they studied were legally monogamous, when compared to the females, the men were a) more likely to never marry, b) more likely to remarry following divorce or spouse death, c) more likely to have extra-marital intercourse and with more partners. He infers that male reproductive variance exceeds that of the female because of these differences.

Walsh (1992) also found that male university undergraduates were more likely than females to say they had had extra-marital sex, and on average claimed to have had twice as many sexual partners. Whyte (1990) concludes that males of all social levels tend to report greater sexual experience than their female equivalents. There are two possible scenarios that could account for this:

•These differences reflect current social values and norms, rather than the inherent nature of humans. Males over emphasise their sexual prowess to comply with social expectations, and women down play their sexual experience to accord with social norms. However, Symons (1979) points out that the recent development of contraceptive technology has created a unique environment where males and females are able to engage in sexual involvement without fear of conception. He argues that despite this technology, and the increasingly permissive ideology concerning sexuality, particularly women's, no notable increases in female promiscuity have manifested. This suggests that the higher levels of sexual restriction reported by women is the product of mechanisms deeply rooted in their biology, rather than a reflection of current social expectations.

•There exists a minority subculture of women who sexually service a disproportionatly large amount of males, compared to other women. This group would consist of sex professionals such as prostitutes, and highly sexually active women who either publicly defy social norms or execute their activity covertly.

Neither Perusse (1993), Vining (1986) nor Kaplin and Hull (1986) found male or female socioeconomic status to increase their reproductive success in modern twentieth century Western society (Chapter Two, pg. 52). However, Perusse (1993) believes that, for males, cultural and reproductive success correlate positively in many pre-industrial, horticultural, agricultural, and pastoral societies, including the Yomut Turkmen, rural Trinidadians, Ifalukese of the Western Pacific, fifteenth to sixteenth century Portuguese, and seventeenth to nineteenth century English, Swedish and German peasants. He argues that in pre-industrial societies, the elevated reproductive success experienced by high status males was, or is, primarily due to the greater access they have to fertile females, and their associated high copulation rates.

Voland (1989) studied demographic and population data from north-west Germany between the seventeenth and nineteenth century. He found that, although primarily monogamous, males of nobility typically produced more surviving children than their female counterparts, and males of lower social status. The women of nobility tended to out produce the peasant women of the time, but the reproductive success of low status females exceeded that of males of equal position. Roskaft, Wara, and Vikem (1992) found that in Norway, for the same period in history, social status also had a more pronounced positive effect on male than on female reproductive success, even though monogamy prevailed. The reproductive variance of males can be expected to exceed that of females in monogamous species where extra-pair copulation is common (Chapter Two, pg. 33-34).

Leger (1992) concludes that the available evidence suggests humans were polygynous over a significant period of evolutionary history. The research cited in the preceding sections demonstrate that this conclusion is unfounded: firstly, because it is based on the existence of sexual dimorphism in body size and maturation evident in humans, and did not compare the relative degree of these differences with those of other species, and secondly, did not consider the effect deceptive reproductive strategies can have on the reproductive variance of males in monogamous species. The research provides no unequivocal evidence that humans exhibit behavioural or physiological characteristics that indict the adoption of a particular mating system. The characteristics they exhibit could have evolved in a monogamous or polygamous species.

Shepher (1978) claims that early Pliocene hominids lived a hunter and gatherer life style. He suggests that the stalking and killing of game was done by small, male groups. This, he believes to be because the long period of gestation and the dependence of offspring on the female restricted her mobility. Although hunting provided a rich source of protein, the uncertainty of success meant that food gathering was critical for the

continued supply of nourishment. This, was predominantly done by the women and children of the group as the males hunted. The food likely to have been gathered consisted of a variety of plant materials, nuts, seeds, fruits, tubers, roots, and small animals such a lizards and rodents .The hunter-gatherer method of extracting food required that males and females collaborate to ensure a regular food supply.

He maintains that at first females exchanged sexual favours for the rich bounty of the hunt, and that this led to the lost of **estrus**. This is the brief period of heightened sexual interest and attractiveness observed in all other female mammals which usually coincides with a brief period of fertility (Symons 1979). Shepher (1978) argues that as attractiveness and receptivity became important for the acquisition of high protein food from the males, selection pressure lead to the loss of estrus and the evolution of continued receptivity. He argues that if a male provided food to the women it became in his interests to ensure that the females he was providing for were rearing only his offspring. The only way Shepher (1978) believes this was possible was to guard them. Because the human female was continually receptive, this meant a male was severely restricted in the number of females he could guard. At the same time it became in the interests of the female to mate with the most successful hunter, as this lead to a richer and more reliable food supply. Shepher (1978) believes that because these male and female selection strategies matched, there was a shift to exclusive pair-bonds.

There are two problems with Shepher's (1978) theory:

•Because the male was forced to leave the female on a regular basis (i.e. while on hunting excursions) it is more likely the human male relied on sperm competition as a method of defence against cuckoldry. This is because this strategies would not restrict the male to one female and the substantial reproductive cost this implicates. Baker and Bellis (1995) argue

that sperm competition was advantageous in humans as it has caused the evolution of structures specifically designed to compete at this level. They argue that the human male ejaculate is polymorphic. They found it to consist mainly of sperm morphs programmed to fertilise the females egg, but to also consists of sperm morphs whose role it is to reduce the chances that the egg will be fertilised by sperm from another male. Baker and Bellis (1995) also claim that it is evident from the relatively large scrotal sax, relative to body size, of the human male that males produce a superabundance of sperm. Volpe (1983) provides evidence that the human male produces more sperm per ejaculate than is necessary for fertilisation. He concludes that the average volume of semen ejaculated by the human male is four millilitres, and this can contain up to three hundred and fifty million sperm. A minimum of eighty million per ejaculate is believed as necessary for fertility.

•Shepher's (1978) theory does not explain why polygyny is still practiced in most existing hunter-gather societies. For example, the Yanomano Indians of South America live a hunter-gather life style, yet are highly polygynous. The most successful warriors dominate and lead the group because of their superior powers. These headmen use their power to acquire more wives than lower status males (Ruse 1985).

2.5.1. The Resource Based Perspective

Certain ecological conditions are associated with the adoption of particular mating systems. Orians (1980) found that the distribution of resources necessary for survival and reproduction within the organism's habitat is of particular importance. Wilson (1975) concludes that in general species which occupy environments where essential resources are unevenly distributed, and are defendable, tend to be polygynous. Typically in such species, the dominant males control access to these resources. They offer

access to females in exchange for mating privileges. In this situation the cost to the female of sharing a successful male is outweighed by the shortage of crucial resources which weaker males are unable to provide. Conversely, Wilson (1975) concludes that species which inhabit environments where resources are in a sufficient abundance to provide for all members and/or are evenly distributed, monogamy tends to dominate. He argues that within these species, it is the quality of male parental investment that is at a premium. This is because under these circumstances, it is the quality of parental care that varies among males rather than mere resource acquisition.

A resource based perspective appears able to explain the different mating strategies adopted in existing human cultures. Gould and Gould (1989) conclude that, as predicted, in most existing polygynous cultures there are typically only a few elite males (tribal chiefs, accomplished hunters or respected warriors) with control over each group's resources. The dominant males control the resources necessary for survival and reproduction and use this privilege to sequester females. Gould and Gould (1989) and Symons (1979) argue that when ritualised symbols of pair-bonds are practiced in these cultures they are a political and economic contract intended to amass individual's or a leader's resources or improve the social relations of families and/or tribes. Gould and Gould (1989) conclude that in most existing monogamous cultures, the resources necessary for survival are sufficiently distributed across all members, although in some cases inequalities do still exist. The examples they give are the !Kung bushpeople of southern Africa and industrial Western societies.

Gould and Gould (1989) conclude that the hunter-gather way of life, herding or agriculture, outside of habitats were resources are extremely scarce (e.g. !Kung), affords polygyny as it enables the domination of resources by the most successful or powerful males. Gould and Gould (1989) offer no explanation for why Western culture was unique. This is a problem with this perspective.

Where monogamy is the preferred mating system in humans it appears to be facultative rather than obligate (Chapter Two, pg. 31). This explains the overall pattern of sexual dimorphism, Leger (1992) observed in humans, that is typical in species characterised by female epigamic selection and male intrasexual competition. Western behaviour fits well with expectations concerning other facultative monogamous species. However, due to the uni-cultural nature of the research discussed below, further research is needed to establish the extent to which these behavioural tendencies are evident since the shift to monogamy in Europe and in other cultures where necessary resources are evenly distributed, before it can be concluded that they reflect a genetic disposition evolved through natural selection rather than culturally imposed (Chapter Five, pg. 117).

In Western culture there is a well established and dominant pattern of pair-bonding. Marriage, the symbolic expression of a life commitment to a pair-bond, is common (Kenrich, Sadalla and Trost 1990). For example Whyte (1990) concluded that nearly ninety five percent of all Americans get married. However, as in other facultative monogamous species these bonds tend to be weak and polygamous behaviour is evident. Ridly (1993), Essock-Vitale and McGuire (1988) and Chamie and Nsuly (1981) observed in their Western samples, divorce is common and remarriage frequent. Extra-marital sexual activity also appears to be common for many Western married couples, despite social disapproval. Symons(1979) established that the incidence of sexual infidelity is approximately seventy percent for males and forty percent for females. The number of sexual partners a Westerner is likely to have in his/her life time varies from three to eight depending on the size and nature of the sample (Ridly 1993).

As predicted, Western females are more sexually selective than their male counterparts. Studies involving questionnaires and the analysis of the type of personal advertisement often found in newspapers and popular magazines, have found consistent gender differences. Kenrick, Sadalla,

Groth, and Trost (1990) compared the minimum requirements for a potential partner reported by male and female college students. They found the male's and the female's were selective, but the female's typically reported higher personal requirements. Landolt, Lalumiere and Quinsey (1995), Greenless and McGrew (1994), Wiederman (1993) and Walsh (1993) found that, in a number of samples of American personal advertisements, females were more likely than males to specify long-term commitment or matrimonial relationships. The females tended to seek friendship first with the possibility of further sexual involvement. Typically the males stipulated sexual involvement foremost. These findings suggest that Western females are more selective, prefer to restrict sexual activity to long-term relationships, and to extend courtship for longer than males.

Also as predicted, intrasexual competition is more evident in the behaviour of Western males than females. Greater aggression in males than females is a frequent characteristic in species where male intrasexual competition is an influential selection pressure (Trivers 1985). Aggression is more common and pronounced in human males than females. Berkowitz (1993) postulated that this is due to its relation with testosterone levels, and the Y chromosome, although he acknowledged that its development and expression in the individual is dependent, to a large extent, on the social environment. Gould and Gould (1989) suggest that the greater male interest in directly competitive sport, and the emphasis placed on male athletic achievement and prowess could also be considered a sign of a greater tendency to intrasexual competition in males than in females. Walters and Crawford (1994) asked a sample of American college students to indicate the methods they use to attract a mate in a number of social settings. They found that the males were more likely than females to advertise their athletic prowess in an attempt to attract a potential partner. Furthermore males and females perceive this to be a significantly more effective means of attracting a mate for men than women.

2.6. Selection Preferences and Strategies

Assuming Westerners evolved under the selection pressures on a facultative monogamous species, not only female intersexual selection is predicted, but also some degree of male intersexual selection. Verrell (1990) argues this is the case in any species where the male invests in his offspring in a way that restricts what he can investment in other offspring. Human females and males can be expected to differ in their selection criteria. Wilson (1975) observed that male parental investment, in mammalian species, usually takes the form of food, shelter, territory, and protection. As the human males' capacity to offer these resources would have varied, in the ancestral environment, Symons (1979) believes females evolved a selection preference for indicators of a male's ability to provide these resources. Conversely, Wilson (1975) observed that the females of mammalian species typically invest directly in the offspring, i.e. they contribute their own body nutrients to the gestating foetus and to the developing infant. Symons (1979) proposes that because females vary in the degree to which they can offer these, depending on their phenotype, males evolved to select a potential mate on the basis of her phenotypic quality.

Buss and Barnes (1986) examined the preferences in mate choice of a sample of American married couples. They asked them to rank the most important qualities and characteristics they were looking for in a sexual partner. Sprecher, Sullivan and Hatfield (1994), Feingold (1990), Howard, Blumstein, and Sckwartz (1987) and Buss (1987) replicated their research using different American samples. From these studies it is evident that Westerners are consistent in what they consider important in a sexual partner. They found that males and females typically saw kind, humorous, understanding, and intelligent, as the most important attributes. Male

x check sp it may be Schwart: y correct also in ref list if so.

subjects typically considered physical attractiveness as more important than female subjects, and the females ranked the socioeconomic status and earning capacity of a partner as more important than the males did. Table 2.1. lists the characteristic the males and the females ranked as most important in Buss (1986).

Table 2.1. The Highest Ranked Characteristics Sought in a Mate.

	Male.	Female.
1	Kindness & Understanding	Kindness & Understanding
2	Intelligence	Intelligence
3	***Physical attractiveness***	Exciting Personality
4	Exciting Personality	Good Health
5	Good Health	Adaptability
6	Adaptability	***Physical attractiveness***
7	Creativity	Creativity
8	Desire for children	***Good earning capacity***
9	Collage graduate	Collage graduate
10	***Good earning capacity***	Good heredity
12	Good housekeeper	Good housekeeper
13	Religious orientation	Religious orientation

(Adapted from Buss 1986, p.g. 568)

These findings accord with evolutionary principles. The females considered socioeconomic status and other qualities that indicate resource acquisition in Western culture, as more important in a mate than did the males. The males considered attractive physical characteristics in a partner as more important than their female counterparts. However, the females, on average, ranked physical attractiveness higher than earning potential. How physical attractiveness is defined by the two sexes explains this discrepancy. It appears that men and women diverge in their criteria for physical attractiveness in a way that reflects predicted selection preferences. The attributes Jankowiak, Hill and Donavan (1992) established as those males

find physically attractive are indicative of phenotypic quality, whereas the attributes females consider physically attractive are more indicative of a willingness and ability to provide and support. Jankowiak et.al. (1992) found that women tended to define *good looks* as a group of compounded personality attributed e.g. happy, thoughtful, smart, fun, unintimidating. Conversely, males tended to define *good looks* as a compound of physical attributes such as wide eyed, full hair, clear complexion.

Buss and Barnes (1986) put forward an explanation to account for the most important selection criteria typically stipulated by Western populations: kind and understanding, and intelligent. Buss and Barnes (1986) suggest that these characteristics have become selection criteria as they facilitate cooperation and the sustainment of the weak pair-bond. They argue that these characteristics in a mate increase the chances the couple will be able to synchronise their behaviour and stay together long enough to nurture the new born to maturity. This selection preference is particularly advantageous in humans because of the prolonged period of gestation and dependence of the human infant on its parents, as recognised by Volpe (1983).

Greenlees and McGrew (1994) and Wiederman (1993) found the sexual differences in mate selection preferences observed in the previously cited research, were reflected in the characteristics males and females asked for in personal advertisement place in various American and English newspapers and magazines. As predicted both males and females typically stipulated attributes such as kind, understanding and intelligent foremost. Women were more likely than men to stipulate a preference for potential mates who have financial resources and qualities which are likely to lead to resource acquisition, e.g. education. Males who advertised were more likely to request a physically attractive partner. Greenlees and McGrew (1994) and Wiederman (1993) also found that males were consistently more likely than

females to advertise their financial resources or social status. Females tended, more than males, to advertise their physical attractiveness.

Walters and Crawford (1994) and Buss (1988) provide additional evidence that the intrasexual competitive strategies Westerners use to attract a sexual partner concur with evolutionary expectations. Like Walters and Crawford (1994), Buss (1988) asked a sample of American college students to indicate the methods they use to attract a mate. In both studies the males were more likely than the females to enhance or attempt to draw attention to their financial resources or social status. Females tended, more than males, to draw attention to or enhance their perceived physical attractiveness. Walters and Crawford (1994) conclude that both the males and females they sampled considered drawing attention to or enhancing physical attractiveness and domestic skill by females, and financial resources and athletic ability by males to be the two most effective means for each sex of attracting the opposite sex.

It is evident that Western females, as in many mammalian social species, prefer mates with greater resources. This selection preference has evolved in many mammalian social species as it increases reproductive success. However, Perusse (1993), Vining (1986) and Kaplin and Hull (1986) observe that in Western culture, position in the male social hierarchy does not correlate with reproductive success. Vinning (1986) argues that it is the time Westerners spend striving for economic and occupational status that reduces the number of offspring they produce. Because striving for success is a quality intensely favoured within Western culture despite its reproductive costs, he concludes that adaptionist evolutionary principles are inappropriate for the explanation of human behaviour in modern environments.

Kaplan and Hill (1986) argue that although the birth rate in middle and upper class families is typically lower than in families from lower

socioeconomic groups, the quality of parental care is substantially better. Parents from more privileged backgrounds can more easily provide those resources that are valued in Western culture. These resources serve to substantially enhance their offspring's future chances of success, they can provide a richer learning environment, a higher quality of life, and future prosperity through, for example, inheritance and nepotism. Kaplan and Hill (1986) found children from a high socioeconomic bracket live longer, are healthier, and are better educated.

In Kaplan and Hill's (1986) argument socioeconomic status remains highly valued, and an influential female mate selection criterion in Western populations, because it enhances the chances of the survival of the offspring. Kaplan and Hill (1986) misconstrue what is adaptive. Although the lives of the higher social classes may be better and longer, this is only adaptive if it increases reproductive output, the currency of natural selection. For example in some species which inhabit ecologies where resources are scarce, investing more in fewer offspring means offspring are more likely to see adulthood and reproduce (Wilson 1975). However, although this could be the case in some pre-industrial cultures, this is not the case in contemporary Western culture. Resources are sufficiently available and evenly distributed so all members of the population have at least enough for their own and their children's survival. This is evident in the fact that despite their disadvantages, Vining (1986) observed, that people from lower socioeconomic groups still produce more surviving children who live long enough to continue to out-produce the higher social classes.

Buss (1989) employs the principles developed in Evolutionary Psychology to explain this paradox. He believes that the greater value Western females place on a potential mate's socioeconomic status is the contemporary manifestation of selection preferences that evolved in the past. This, he believes, is also the case for the male's selection preference for physical attractiveness. Buss (1989) like other Evolutionary Psychologists,

such as Symons (1979), believes that if humans exhibit uniform dispositions across a range of cultural and environmental context, their causes are at the genetic level and evolved during the Pleistocene epoch. Buss (1989) tested his predictions with data from thirty seven samples drawn from thirty three countries, located on six continents and five islands. Data collection varied due to the constraints imposed by cultural values and systems. In nearly all the societies he sampled, females valued characteristics which are directly related to resource acquisition in a mate more than males did. The particular characteristic preferred depended on the society, as the attributes indicative of resources varied across cultures. Physical attractiveness was valued more by males than females in all the cultures sampled. He did not assess the expectation that males from polygynous cultures are less selective than males from monogamous cultures.

Perusse (1993), by recognising the influence culture can have on contemporary human behaviour, was led to an alternative explanation. Perusse (1993) turned to industrial societies to see if social status was correlated with **potential reproduction**. This he measured by copulation frequency and promiscuity. He found a high correlation between single males' social status and potential reproduction. Perusse (1993) claims that the pattern he found was remarkably similar to that observed in many polygynous traditional societies (Chapter Two, pg. 42) and would result in a substantial positive relationship between cultural and reproductive success in industrial nations, were it not for the novel conditions imposed by contraception and legal monogamy.

Perusse' (1993) argument is still applicable if facultative monogamy is the natural, rather than legally imposed, mating system of Western peoples. In this scenario the selection preference for resources was, until the introduction and the recent common practice of contraception, maintained in Western culture by the selective pressure of extra-pair copulation. Its reproductive advantage being that the offspring will inherit the sexual appeal

of their father. This postulate predicts that married as well as single males of high social status have higher potential reproduction than males of lower social status.

2.6.1. Tactics.

Kenrick et.al. (1990) were the first to suggest that male and female sexual selection criteria vary depending on the anticipated investment in the relationship. They found that pertaining to personal characteristics such as intelligence, kindness, understanding, sense of humour, physical attractiveness and socioeconomic status the males and females in their sample of students, exhibited lower requirements for casual sexual and dating relationships (**short-term**) than for marriage or steady involvement (**long-term**). Males still had higher requirements for the physical attractiveness of short and long-term partners than did the females. Females also still showed a greater consideration than males for a potential partner's socioeconomic status, whether a short-term or long-term relationship was intended. Apart from physical attractiveness, females tended to have a higher minimum requirement in all the other characteristics than males, for both long-term and short-term relationships.

Kenrick et.al. (1990) argue that, for both sexes, parental investment is lower in short-term than in long-term relationships. They believe that it is for this reason that males and females are less selective when considering a potential short-term partner. They suggest that females are generally more selective than males because females face a greater investment whether a short-term or long-term relationship is intended. This is because, in both situations, if she becomes pregnant, she is responsible for the gestating foetus and its nurturing requirements if she is to bring her offspring to maturity.

Symons' (1979) earlier theorising confers with that of Kenrick et.al. (1990). He points out that the human male will benefit reproductively from copulation with almost any fertile female if he can avoid further commitment: The greater the number of sexual partners, the more offspring he is likely to produce. Conversely, Symons (1979) argues that, although in some situations committing himself to a long-term relationship is reproductively adaptive for the human male, he is embarking on a substantial parental investment. In this situation he will only increase his reproductive success if he is sexually selective.

It can be expected that females are less selective of a dating relationship, if it is not sexual. However, according to the evolutionary principles postulated in this chapter, the human female can only increase her reproductive success by being sexually selective whether she embarks on a short-term or long-term sexual relationship. In both situations she faces a substantially larger parental commitment than the male. In a monogamous species there is no reproductive advantage for the female in pursuing a short-term sexual relationship, because she is left with the demands of new offspring without the beneficial parental assistance of a male. Trivers (1985) observed that in many monogamous bird species, females will seek extra-pair copulations. Trivers (1985) argues that in seeking extra-pair copulation, the females of these species are at an advantage if they are able to sequester the genes of a superior male, and still be assured of parental assistance from their mate. Trivers (1985) suggests that this is only adaptive in species where the female's choice for phenotypic quality is at variance with the female choice for investment. Therefore, if Western females have evolved to pursue short-term sexual relationships, this would only be advantageous if they are already in an established pair-bond and able to cuckold their partner by mating with a genetically superior mate. In such a scenario a female is guaranteed the advantage of parental assistance in bringing her infant to maturity and the benefit of superior genes.

Landolt et.al. (1995) introduce a distinction offered in evolutionary literature between **strategy** and **tactic,** to facilitate the understanding of the possible influence of mating context on human reproductive behaviour. They describe a reproductive strategy as a system of decision rules involving one or more sets of alternative behavioural tactics. One tactic is preferred over the others as it maximises reproductive success, but in certain social or ecological situations, alternative tactics are more advantageous. Therefore, a reproductive strategy is the direct product of phylogenetic selection, and a reproductive tactic is the product of the mating context in accord with the underlying strategy. Landolt (1995) argues that the male preferred sexual tactic is short-term, and the female's is long-term, due to the reproductive advantage these tactics entail for each sex. However, in the special situations described above, it is in the interest of males and females to pursue the alterative mating tactic.

It is evident from the research cited in section 2.5.1.(pg. 47-48) that Western males are more willing to engage in short-term sexual relationships than females. In addition to this, Symons and Ellis (1989) demonstrated that American male college students were consistently more likely than females to say that they would be willing to have casual sexual intercourse with an attractive anonymous stranger. This difference was sustained even if risk of pregnancy, discovery, and disease were absent. Further evidence that males desire sexual variety more than females comes from the existence and nature of the pornography industry which caters for an extensive male market (there is a lack of a female market of any notoriety), and has existed for many centuries. The first recorded examples originating from the Roman Empire (Betzig 1992). Shepher and Reisman (1985) state that pornography is characterised by its explicit sexual content, usually focusing on the female genitalia. The most popular forms provide a continued procession of anonymous, and sexually explicit images or acts devoid of any context, plot, and often even flirtation. Ridly (1993) believes that these characteristics

reflect the male's preferred sexual tactic, one that seeks sexual variety and focuses on copulation.

Landolt et.al. (1995) attempted to establish the contextual determinants for the adoption of short-term and long-term sexual relationships. They found that, from a sample of American college students, the better the males perceived their mating success to be, the more likely they were to prefer or select a short-term relationship. Self perceived mating success had no influence on the females mating preference. Landolt et.al. (1995) argue that because mating success was measured by self reported differential access to mates, the mating behaviour of those subjects who perceive their own mating success to be high, would reflect the tactic associated with their sexes typically preferred tactic: Individuals of high mate value are more likely to be able to carry out their preferred tactic. This is assuming self-perceived mating success predicts actual mating success. They offer no explanation for why it had no effect on female preferences. Landolt et.al. (1995) found that the more attractive the stimulus person was perceived to be the more females and males wished to pursue both a short-term relationship, and a long-term relationship. In accord with Kenrick's et.al. (1990) findings, they also found that the more attractive the stimulus person was perceived to be the more likely the males and the females would choose a long-term relationship over a short-term relationship.

From the research presented in this section it is evident that Western males practice different reproductive tactics and that these accord with evolutionary principles. Although it is evident that Western females pursue different reproductive tactics, at this stage, it appears they do not concur with the evolutionary principles proposed in this section. This is because Western women are consistently less selective for short than long-term sexual relationships. Further research is needed that extrapolates the mating tactics pursued by pair-bonded females and those pursued by single women.

If the predictions are correct, single women should generally show little interest in short-term sexual relationships.

Symons (1979) suggests that human males will prefer cues of a potential mate's **reproductive value** or **fertility,** depending on the reproductive strategy evolved in the past. He defined reproductive value as the total units of expected future reproduction; the extent to which a person of a given age and sex will contribute to the ancestry of future generations. This differs from fertility, which he defined as, the present capacity to conceive or induce conception. Symons (1979) argues that if the human species evolved under the selection pressures of a monogamous mating system, males would seek to maximise the reproductive value of a potential mate. This would increase the number of children he and his mate could conceive in their life time. Conversely, if humans have evolved under the selection pressures of a polygamous species, males would have evolved a selection preference for cues of a female's peak fertility. This is because at this point the chances of immediate successful conception are increased.

Symons (1979) goes on to argue that the perceived age of a female is a salient cue of reproductive value or fertility. He proposes that a female's reproductive value is normally at its highest in her mid teens, and declines monotonically thereafter, with age. A nubile teenage girl has a whole lifetime of fecundity ahead of her. This is more likely to have been in her late teens, because Eveleth and Tanner (1979) and Tanner (1973) observe that traditionally the onset of menarche was about four years later than it is today in developed nations (Chapter Three, pg. 81). Kaluger and Kaluger (1979) conclude that the female's fertility on the other hand normally peaks between twenty five to twenty nine years of age. During this period, more than any other in her reproductive career, the vaginal environment is conducive to sperm longevity and mobility and the chances of reproductive errors such as maternal and infant mortality, and congenial deformities are at their least. Symons (1979) recognises that male fertility and reproductive

value are less age graded than women's. He suggests that women will typically prefer partners older than themselves as in many other social species, with age comes dominance and resource accumulation.

If Western males do have different selection criteria depending on the reproductive tactic they intend to utilise it would be expected that these would differ in the perceived age found attractive. If a short-term sexual relationship were intended, although generally the degree of selectivity will be less than if pursuing a long-term mating tactic, it would be advantageous to select a female in her late twenties (age of peak fertility). For a long-term relationship the male should find a female perceived to be in her late teens, most attractive (age of peak reproductive value).

It is evident that perceived youth does play an important part in the human male's sexual selection criteria. Ridly (1993) observed that most of the characteristics Jankowiak et.al. (1992) found Western men consider to make a female physically attractive, exhibit the strongest decrement with age as well as health. Cunningham (1986) found that the characteristics males perceived as facially attractive were those typical of a juvenile face, i.e. large eyes, small nose and smooth skin. Korthase and Trenholme (1982) found that Western males of a variety of ages perceived age of women, determined from their portraits, as negatively correlated with their perceived attractiveness.

Greenlees and McGrew (1994), Sprecher et.al. (1994), Wiederman (1993) and Kenrick and Keefe's (1992) content analysis of personal columns in Western newspapers and magazines found that males were more likely than female's to request a youthful partner. The females typically requested mature males. In Kenrick and Keefe's (1992) sample, where age was specified, the youngest men who advertised were in their early twenties. They found that these male's were equally likely to be attracted to women above and below their own age, requesting partners on average five years

above or below their own age. However, as men became older they stipulated a preference for women increasingly younger than themselves, with the oldest age group's (50-60 years of age) minimum requirement being two years younger than themselves and the maximum being a generation younger. Where age was stipulated, females from all age groups requested, on average, potential partners from two to five years older than themselves. Kenrick and Keefe (1992) found that the same pattern was evident for both sexes in marital advertisements published in an Indian news paper.

Buss (1989) found that across the thirty seven different cultures he sampled, males indicated a preference for partners who were, on average, two years younger than themselves. Conversely, the females tended to prefer males older than they were. By subtracting the mean age differences preferred between males and their mates from the average age of women males preferred to marry, he inferred that human males typically prefer to marry women in their mid twenties. Buss (1989) found the two cultures that exhibited the most striking age differences were the only two predominantly polygynous cultures he sampled. In these two countries (Nigeria and Zambia) males typically preferred women six to seven years younger than themselves. In these cultures, he observed that the males are typically older when they acquire wives than males in monogamous cultures. Kenrick and Keefe (1992) cite three anthropological studies of existing traditional polygynous cultures that observed that the males, regardless of their own age, prefer nubile mates.

Kenrick and Keefe (1992) argue that the reproductive advantages of cooperative parenting proposed by Buss and Barnes (1986) has caused people's own ages to influence their age preferences in the monogamous cultures. They argue that this is because people of similar age are more alike in personal experiences, values, and behaviours and therefore are more likely to interact positively. Myers (1983) cites a number of research articles that illustrate the extent to which members of a dyad who share personal

similarities, positively influences synchrony of behaviour and how amicably they interact and cooperate.

Epstein and Guttman's (1984) conclusions suggest that this phenomenon translates to marital satisfaction and success. They conducted a comprehensive review of previous research that has studied the effects that partner similarity has on marital success and satisfaction. The methods used to measure marital satisfaction and success have varied between study. Generally, however, marital success has been measured by the absence of separation or divorce over time, and marital satisfaction has been gaged from the couples' responses on modified scales that have proved to correlate with satisfaction in other social contexts. Epstein and Guttman (1984) observed that homogeneity in couples' personal backgrounds and personality characteristics consistently correlate positively with marital satisfaction and to a lesser extent, marital success. Similarity in spouses' sexual behaviour and sexual attitudes were found to be better predictors of marital success. However, matching on similar social attitudes had little effect on either marital satisfaction, or success.

Polygynous cultures can be expected to exhibit the most pronounced age differences, as the advantage of cooperative parenting is not an influencing factor. However, it appears the age preferences of males from polygynous cultures are lower, and the age preferences of males from monogamous cultures are higher than Symons (1979) expected. Symons (Open peer commentary, Kenrick and Keefe 1992) points out that, due to various life style factors, women from modern Western industrial culture maintain a relatively youthful appearance for longer than females from traditional cultures do. He suggest that it is for this reason that males in Western culture prefer older females than expected.

Although the research of Quinsey et.al. (1993) was designed to assess covariation among measures of sexual interest, their data support Symons'

theory. They conclude that males perceived the attractiveness of Western adult and teenage females to be equivalent. Quinsey et.al. (1993) measured the perceived physical and sexual attractiveness of upper body photographs from three age categories (children, pubescence, and adults). Their sample of male American university students, perceived the adult stimuli as slightly more attractive than the pubescent, but this comparison was not significant. The adult and the pubescent stimuli where both seen as significantly more attractive than the children.

Research to date has not extrapolated the age preferences exerted by males when pursuing different reproductive tactics. However, inferences can be made from the data of Quinsey et.al. (1993). Copulation should be the primary goal for a male, when pursuing a short-term mating tactic. This is because, for the male, the reproductive advantage in pursuing a short-term relationship, is to conceive additional offspring with as minimal investment as is necessary. Therefore, if Symons' (1979) predictions are correct, cues to a female's fertility are likely to be more sexually attractive than physically attractive. Their findings suggest that Western males do not differ in their perceptions of attractiveness depending on the reproductive tactic they intend to pursue; perceptions of physical and sexual attractiveness were equivalent. However, these conclusions are circumspect. Further research is needed that directly compares males' perceptions of attractiveness across mating tactics.

2.6.2. Deceptive Advertising.

For many species signs of conspicuousness, for example the Blue Peacock's *(Pavo Cristatus)* tail, are reproductively advantageous in the way that they serve to attract potential mates by advertising their reproductive quality. Low (1979) argues that in humans, sexually selected characteristics are frequently, culturally modified to enhance conspicuousness. He argues

that there are a number of ways in which this has been achieved. One of the examples he gave was, the penis sheath worn by Yammot Indians. He argues that this serves to augment perceived physical vigour.

Low (1979) found cross-cultural support for his theory. He found from a sample of one hundred and thirty eight different pre-literate and post-literate cultures, body ornamentation served different functions for men and women, and trends between the two sexes diverged with the sexual selection criteria of the opposite sex. In all the cultures studied, males were more likely than females to wear ordainments relating to physical prowess or social status. Females were more likely to wear ordainments that advertised their availability or unavailability, their chastity, and enhanced their physical appearance. Male intrasexual competition was the most intense and the degree of male ornamentation was correspondingly the greatest in polygynous cultures.

Low (1979) argues that cultural augmentation of sexually selected characteristics increases the possibility for deception. This is because cultural ornamentation can hide some conditions and can mimic or change others. One example of this is the Western practice of cosmetic surgery to, among other things, remove cumulative signs of aging such as facial wrinkles.

The Body Beautiful:
Possible Origins Considered

The idealisation of a slim female body shape in contemporary Western culture is salient in its social norms and behavioural practices. This is evident from the research reviewed in Chapter One. This beauty standard is problematic within the evolutionary program, because of the biological functions and reproductive advantages of body fat. It is these reproductive advantages that Anderson et.al. (1992), Smuts (1992), Caro and Sellen (1990) and Beller (1977) believe led to the traditional male sexual preference for plump mates. This selection pressure is reflected in the comparative physiological development of modern males and females. Winick (1981) explains that females from birth onward deposit proportionally more fat on their bodies than males, and when adult, carry a higher percentage of subcutaneous body fat. For the traditional male sexual preferences to have been transposed, and for a thin female body shape to have become idealised in contemporary Western culture, female body fat must have faced a significant opposing selection pressure.

3.1. The Functions of Fat

a) Body fat functions as a store of energy. Smuts (1992) and Anderson et.al. (1992) propose that the ability to store surplus food as body fat evolved in mammals, in general, because of the selective advantage this provides in sustaining the individual through eventual periods of food shortage. Beller (1977) argues that within hunter-gatherer cultures, food supply varied with the seasons, and depended on the success of each hunt. Smuts (1992) argues that frequent and widespread food shortages still mark existing pre-industrial populations. He cites research that found seventy one percent of pre-industrial cultures included in the *Human Relations Area Files* suffered food shortages. Smuts (1992) and Sobal and Stunkard (1989) suggest that in pre-industrial culture this was and is primarily due to the limited nature of storage technologies that make possible the preservation of the bounty from the harvesting season to ensure adequate nutrition throughout the harsher seasons. Smuts (1992) suggests that it is for these reason that humans, like other animals, exhibit a variety of physiological and behavioural mechanisms to store surplus calories as body fat.

b) Body fat also functions to insulate the body's core. For mammals, body fat, shape and climate are closely related. Beller (1977) states that this is a result of what are communally referred to as **Burgmann's** and **Allen's** rules. Bergmann's rule states that species that inhabit cold climates tend to be bulkier, heavier, and fatter than species from warmer habitats. Allen's rule states that the colder a species' habitat, the more compact they tend to be, with protrudences at a minimum. Both these patterns of physiology are due to the thermal advantages of a high body mass with minimal skin surface area in a cold climate. Burgmann's and Allen's rules have been found to operate within species. Beller (1977) reports that cold dwelling

subspecies tend to be considerably more compact and bulkier than their warmer dwelling co-specifics.

The shape and distribution of the stone age statues described in Chapter One (pg 7) suggests that body fat was advantageous in early hominids because of its insulatory properties, and that this is reflected in the ideals of early Pleistocene hominidae. The most globular figurines were found at sites which would have been the coldest, over the period in which they were sculptured. The more linear figures were found in warmer areas of the time, i.e. southern Europe (Beller 1977). Beller (1977) cites research that suggests these rules have operated differentially on the physiological evolution of peoples of different nationalities and this has lead to variation within species. She refers to studies that found nationalities from colder climatic zones to be, on average, heavier in terms of weight per height, compared to nationalities from warmer climatic zones. Additionally, national differences in average size, and limb proportions, in populations from similar latitudes match.

Beller (1977) points out that for a predominantly hairless species like humans, the insulatory properties of body fat would have been highly advantageous, particularly during the ice age. However, the insulatory function of body fat is of lesser importance in post-industrial culture because of the adoption of clothing and the time spent in climatically controlled environments, e.g. heated homes, work places and more recently shopping malls and cars.

c) Female body fat serves to initiate and regulate ovulation through its significant endocrine function. Frisch and McArthur (1974) observed that in their sample of American and European adolescents, at least ten to fifteen percent of their total body weight in fat was critical for the onset of menarche. Twenty-two percent of body weight in body fat was required for the continuation of reproductive function throughout adulthood. Frisch and

McArthur (1974) expect there to be a ten percent variation around these thresholds, between individuals and races.

More recent research utilising considerably more precise measures of body fat and larger samples, found no evidence for a critical fat threshold. Garn, LaVelle and Pilkington (1983) found, in their national sample of Americans of Caucasian and African race, post-menarchial girls were on average fatter than pre-menarchial girls of the same age, however, the body fat distributions overlapped extensively. A period of acutely negative calorie balance did, in a few cases of anorexia, starvation or excessive activity, result in amenorrhoea, yet once again, variation in weight loss across individuals was extensive enough to suggest body fat was not the only controlling factor. Ridder, Bruning, Zonderland, Thysen, Bonfrey, Blankenstein, Huisveld and Erick's (1990) data from their sample of American Caucasian schoolgirls supports that of Garn et.al. (1983). In addition to the findings of Garn et.al. (1983) they observed that body fat distribution was a stronger determinant of menarche than body fat store. They found a gluteofemoral body fat distribution was related to early puberty endocrine activity (Chapter Three, pg. 76-77). It appears body fat does influence the initiation and regulation of ovulation, however, the relationship is weak and there is no evidence for a common critical fat threshold.

d) Female body fat is important for parturition due to its association with neonate size and birth weight. Caro and Sellen (1989) report that maternal weight positively correlates with neonate size and birth weight. Larger neonates are less likely to be born prematurely, deformed or still. They observe that a high birth weight advantages the infant throughout its life. Birth weight predicts a better chance of survival because heavier children at birth remain healthier, taller and more robust individuals than their lighter cohorts, throughout childhood. Additionally, they found, birth weight procures a higher reproductive value. The daughters of fatter mothers

reach menarche earlier and have a slower but more regular ovulation cycle. Low maternal weights are associated with low foetal haemoglobin concentrations, which increases the chances of foetal abnormality, prematurity, low birth weight, death as an outcome of pregnancy and long inter-birth intervals.

Caro and Sellen (1989), from their review of the available research, conclude that it is specifically body fat gained during maternity that determines neonate size and birth weight. Mrosorsky (1981) found that the main period of maternal fat gain is during the middle trimester. He found that American mothers normally gain over this period three and a half kilograms of subcutaneous body fat. It is not until the third trimester that the developing foetus requires this reserve. Further reserves are required to maintain lactation, although Mrosorsky (1981) did not find the number of calories needed be high: approximately seven hundred kilojoules a day. Caro and Sellen (1989) and Mrosorsky's (1981) research suggests that most of the fat gains the mother makes during early pregnancy are transferred to the developing foetus in the third trimester.

Johnson, Knight, Oyemade, Cole, Westney, Westney, Laryea, and Jones' (1994) results provide further support for Caro and Sellen (1989) and Mrosorsky's (1981) conclusions. They investigated the relationship between various anthropometric measures to pregnancy outcome in an extensive sample of urban, African American women. The most strongly related anthropometric measures were of pregnancy adiposity gains. They found that pregnancy adiposity gain correlated with successful pregnancy outcome primarily due to the strong positive relationship these measures had with neonate size and birth weight. Unexpectedly, they found measures of prenatal dietary intake were poor predictors of pregnancy outcome in their sample. They recognise that although African women in America represent a socially deprived minority, they are well nourished. Johnson et.al. (1994) predict that prenatal dietary intake would have a more pronounced impact on

maternal weight gain and pregnancy outcome in populations that are chronically undernourished.

Bongaarts (1980) reviewed the available research on the effects of chronic malnutrition on female fecundity. His conclusions rely primarily on studies that compared developed and developing countries. He found clear evidence that the average age of menarche was related to national nutritional status. However, as the average total number of successful births a human female is capable of varies between six to seven, Bongarts (1980) argues that substantial changes in age at menarche can be expected to affect total successful parturitions by, at most, a very small percentage. National nutritional status appeared to have no significant effect on the mean age and duration of menopause, mean age of last birth, or chronic sterility. Bongaarts (1980) also found there to be only a three percent difference in levels of fertility (as measured by successful child birth from married couples) between developed and undeveloped cultures.

Bongaarts' (1980) concludes that because developed and undeveloped countries exhibit extreme differences in nutritional status that the nutritional status of mothers has little effect on fecundity. However, he did not account for the influence of a number of fertility inhibiting factors. The most influential fertility inhibiting behaviours that vary across developed and developing nations are:

i. Late marriages and marital disruption.

ii. Deliberate birth control e.g. contraception, child taxation. ? taxation per child

iii. Duration of breast feeding and lactation amenorrhoea.

Beller (1977) sees the accumulation of substantial body fat reserves as advantageous for parturition, in early hunter-gather cultures. This, she claims, was because of the high energy demands, restricted mobility and temporary loss of sexual attractiveness, the extended period of gestation and lactation entail. Conversely, Smuts (1992) argues, high levels of body fat in males would have reduced their mobility, impeding their ability to hunt, thereby proving disadvantageous.

The research review in this section suggests that it is reproductively advantageous for women from cultures where food supply is uncertain to store surplus calories as body fat to maintain ovulation (fertility) through eventual periods of food shortage and to ensure ample reserves are available during late pregnancy. Frisch and McArther (1974) suggest that at least sixteen kilograms of stored fat is necessary for pregnancy and three months lactation. However, because food supply is more than sufficient and reliable for industrial Western populations, substantial fat reserves are not necessary to maintain ovulation through periods of food shortage, and pre-maternal diet is less important for maternal fat gain and pregnancy outcome because sufficient nutrition is assured over this critical period.

3.2. Thinness Explained

A number of selection pressures have been proposed to account for the contemporary Western female beauty standard. These are discussed in this, and the following section. Anderson et.al. (1992) propose five socioecological factors that they found to account for variations in the level of female body fat, idealised across existing cultures. The authors argue that these factors determine cultural attitudes to female body fat that were adaptive in the ancestral human environment, or are currently adaptive. These factors were derived from nine testable hypothesis provided by, with some modification, the biological functions of body fat discussed in section 3.1., and a number of theories designed to explain varying behavioural phenomena.

Anderson et.al. (1992) used data from *The Standard Cross Cultural Sample,* derived from *The Human Relations Area File,* to establish which of these hypotheses predict the level of female body fat perceived to be attractive in existing cultures. They included only those societies for which the dependent variable ***beauty*** (the female body shape considered most attractive i.e. thin, moderate or plump) could be coded. As far as possible previously published variables were used, but where they had to code, a reliability check was conducted using a second naive coder. Inter-rater reliability was high for all the new scales Anderson et.al. (1992) created. The sample used to represent each culture was rather small. This is not problematic for small primitive societies, as one can expect a reasonable level of homogeneity, due to their small population, ecologically restricted way of life, more limited access to information, and less flexible traditional values. However, for Western culture in general, their samples cannot be considered representative because Western culture is considerably larger and

more diverse than primitive: Anderson et.al. (1992) used only data from Ireland, and New Ireland.

In the succeeding five subsections each of the five factors Anderson et.al. (1992) proposed are discussed in turn. Their results will be considered, and their possible relevance to Western culture is addressed. Smuts (1992) wrote the only other paper published that attempts to place the Western ideal in an evolutionary framework. His research is addressed in section 3.2.6.

3.2.1. *Climate*

The first factor Anderson et.al. (1992) propose as an influence on the level of female body fat perceived attractive in existing cultures, is climate. Assuming human body fat functions to insulate the body's core, they suggest that contemporary cultural attitudes to body fat reflect the insulatory requirement to maintain constant body temperature in the ancestral habitat. It is evident from the preceding section that body fat did function as an insulator ancestrally, is reflected in the ideals of early hominids, and has operated differentially on the physiological evolution of peoples of different nationalities (pg. 67-68). Anderson et.al. (1992) argue that because the thermal advantage of body fat increased the survival chances of populations that inhabit cold climates, it translated into a sexual selection preference. Conversely, because being thin avoided overheating, a thin beauty standard evolved in warm climates. They found, in their sample, that the female body shape idealised, correlated with their measure of average temperature, *latitude*. Colder climates tended to be associated with a relatively plump ideal, while the warmer the climate, the more likely there was a thin beauty standard.

Contemporary Western cultural attitudes to body fat do not conform with the conclusions of Anderson et.al. (1992). Firstly, as this is an

ecological effect operating on males as well as females, a similar relationship between preferred male body shape and climate as that for female is expected. The idealisation for thin women in Western culture has no notable male equivalent (Polivey et.al. 1986, Fallon and Rozin 1985). Secondly, contemporary Western culture displays one of the most extreme selection preferences for female thinness out of all existing societies, and yet inhabits a broad spectrum of climatic zones and originates from the northern hemisphere, dominating the cooler northern latitudes.

3.2.2. *Food Security*

In section 3.1.(pg. 67) it was pointed out that body fat can function as a store of calories. Anderson et.al. (1992) conclude that because of the selective advantage for ancestral hominids of storing surplus calories as body fat, for males and females in cultures where food supplies are unreliable, it is still advantageous to prefer to be plump and have a plump mate. Anderson et.al. (1992) found that a plump standard of female physical attractiveness was correlated positively with predictors of *nutritional stress*. Nutritional stress was determined from two measures; annual variations in food supply for the general population and the availability and reliability of food storage technologies. However, a plump female beauty standard was still favoured in the majority of cultures where food supplies were ample and reliable.

Anderson et.al. (1992) concede that this factor does not logically predict a thin female standard of beauty in cultures with ample and secure food supplies, such as in contemporary Western culture, due to the remaining functions of body fat. They provide no explanation why plumpness tends to be less favoured in such cultures. There are health problems associated with obesity, for example heart disease and arthritis, that present a selective cost if levels of body fat are allowed to become too

high. However, Anderson et.al. (1992) recognise that there is no reason to imagine that obesity ever produced significant opposing selection pressures ancestrally. This is because it would have been non-existent or extremely rare in primitive populations. Beller (1977) argues that this is due to the seasonal periods of food shortage, the lack of accessible sources of carbohydrates (i.e. bread, and pasta) and reliable sources of proteins (e.g. meat, eggs). Any long term negative consequences would have been offset by the more immediate positive consequences of having fat reserves to sustain the individual through eventual periods of food shortage.

The lack of regular periods of food shortage, the richness of the Western diet and the sedentary life style enabled by industrialisation and modern technologies have led to obesity becoming a wide spread health problem in Western populations. However, Anderson et.al. (1992) maintain that this is not a sufficient selection pressure to have caused the idealisation of thin women in contemporary Western culture for two reasons. Firstly, the current Western female ideal is sought to such an extent as to cause serious health problems. For example by 1979, the average Miss America contestant was between nineteen and thirty four years of age, was one point seven meters tall, and weighed fifty two kilograms (Garner et.al. 1980). This, according to the *New Zealand Food and Nutritional Guidelines,* Department of Health (1981), is eight kilograms below the minimum body weight recommended for the health of women of that age and height. Secondly, serious health problems resulting from obesity are only evident in a very small minority of Western women. The most dishabilitating and fatal disorders caused by obesity have a greater incidence in males, due to their association with abdominal obesity, the male pattern of body fat distribution (Fallon 1994, Foster and Kendall 1994).

Beller (1977) explains that **estrogen** (the female sex hormone) inhibits fat deposits in the **abdominal** regions and stimulates deposits in the **gluteofemoral** regions. Conversely, **testosterone** (the male sex hormone)

stimulates fat deposits in the abdominal regions and inhibits it in the gluteofemoral regions. Therefore, males normally accumulate fat on the upper regions of the body, over the chest, stomach and down the back. Females normally accumulate body fat on the lower trunk (below the navel) over the hips, buttocks, and haunches. Singh (1993a) concludes, consistent with a link with an abdominal body fat distribution, abdominally obese females are more susceptible than gluteofemoraly obese women to serious health problems such as metabolic complications, hypertension, heart disease, coronary strokes, non-insulin dependent diabetes mellitus, and gallbladder disease.

3.2.3. *Adaptive Reproductive Suppression*

The *Adaptive Reproductive Suppression* hypothesis, proposed by Anderson et.al. (1992), is an extension on the critical fat phenomenon suggested by Frisch and McArthur (1974). It is based on the fact that female body fat functions to initiate and maintain ovulation. It assumes that the probability of ovulation is positively correlated with body fat, and that the slope of this relationship is relatively steep for the level of body fat typical of girls around the time of menarche (Figure 3.1.)(See also pg. 68 - 69). Anderson et.al. (1992) point out that this suggests adolescent girls are able to delay menarche by making relatively minor adjustments to their dietary intake or energy output, to drop below the critical fat threshold for ovulation. This assumption appears invalid. The evidence cited on page sixty eight suggests that body fat does correlate with menarche in the sense that fatter girls tend to mature faster. However, this relationship is not definitive and it is evident that a critical fat threshold does not exist.

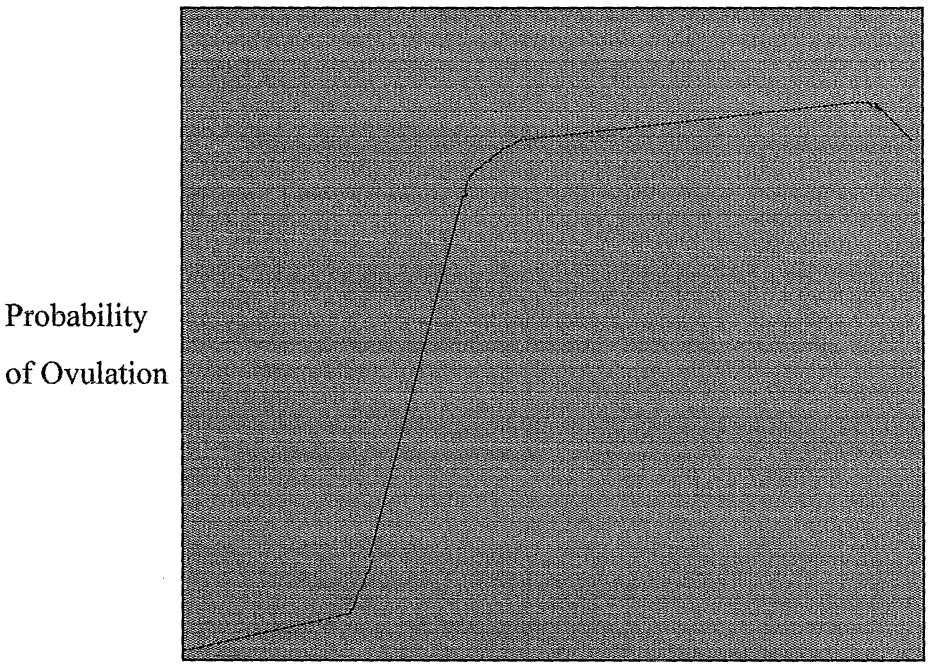

Figure 3.1: The general form of the assumed relationship between levels of body fat and the probability of ovulation. Females in the slender range can achieve large changes in fertility by relatively small changes in body fat. Moderate and plump women would have to gain or lose relatively more body fat in order to significantly change their fertility (Adapted from Anderson et.al. 1992).

Anderson et.al. (1992) claim that the *Adaptive Reproductive Suppression* hypothesis (first proposed by Surbey 1987) suggests an ancestral adaptation in the human female that enables them to identify social situations in which child bearing is disadvantageous, and delay menarche until the situation is more favourable. They argue that this strategy manifests itself in cultures where social support for child bearing is poor for adolescents. In this situation, girls value a thin female body shape as this enables them to delay their first reproductive effort until a more favourable time. Anderson et.al. (1992) believe that older women may also prefer to be

slender in such socioecological conditions because they benefit from resembling younger women, or because support for reproduction is generally poor. To qualify the argument of Anderson et.al. (1992) older women may benefit from being slim if, through out their reproductive lives, the suitability of the social situation for parturition varies: If social support for reproduction is generally poor as Anderson et.al. (1992) suggest, by delaying fertility, a female will not increase her reproductive success as, the authors' wording suggest, conditions will remain poor, irrelevant of timing.

The authors note that this strategy could only evolve in favourable ecological conditions, as it is disastrous for the individual to reduce body fat to a minimum in conditions where an adequate food supply is uncertain. Yet they recognise earlier on in their article that food supply was poor in ancestral human environments, the loci, they suggest for the evolution of this strategy. They do not expect males to share this preference, as to maximise their reproductive success it is still in their interests to select the most fertile (fatter) mate. Therefore, the level of body fat idealised in a culture will also depend on the comparative influence of the male sexual preference compared to the females' reproductive interests on reproductive success and the prevailing cultural norms. The way in which Anderson et.al. (1992) account for these variables is addressed in section 3.2.4. *Battle of the Sexes*.

Anderson et.al.(1992) employed seven variables they thought would measure cultural attitudes and behaviour toward reproductively active adolescent girls. They classified each culture, from their sample, according to: the degree adolescent girls were protected from males sexual advances, the level of encouragement for sexual behaviour in adolescent girls, the degree of restriction or taboos on adolescent sexual activity, the frequency of premarital sex by females, attitudes toward premarital sex, and the social consequences of teenage pregnancy.

None of these variables independently correlated with the beauty standard. Anderson et.al. (1992) did not expect them to, they predicted the variables would interact in a way complimentary to one another. For example, in cultures where the consequences of illegitimacy are severe, girls tend to be protected from male sexual advances and premarital sex is uncommon. Therefore, the authors defined two composite measures intended to calibrate the degree to which cultural values and behaviours concerning adolescent sexuality complimented one another. Both measures scaled the degree to which adolescent girls were exposed to situations where it was difficult to avoid sexual activity, yet punished premarital sex and provided little social support for illegitimacy. Anderson et.al. (1992) found that the level of stress associated with adolescent sexuality, as measured by the two composite variables, correlated with the female beauty standard in the expected direction.

Anderson et.al. (1992) predict that in industrial Western culture, adolescent sexual activity is stressful. They argue this is due to the institution of unchaperoned dating, advertising that exploits adolescent female's sexuality and its harsh and unsupportive response to teenage girls who become pregnant. They suggest that *Adaptive Reproductive Suppression* is an influencing factor that has lead to the idealisation of thin women in Western culture, and a pattern of adolescent dieting behaviour. It could be because Anderson et.al. (1992) expect male and female selection preferences to diverge in this situation that Western male sexual preferences do not accord with the contemporary slender female ideal presented in the media and emulated by women. However, contemporary Western male sexual preferences are influenced by the prevailing ideal as they do tend to prefer a more compact female body shape than their forefathers (Chapter One, pg. 4-5).

The only comment Smuts (1992) makes on the research of Anderson et.al. (1992) is that reproductive suppression by weight control seems inapplicable in developed nations where easier and more reliable methods of birth control are readily available. Indeed, weight restriction by Western adolescent girls rarely delays menarche for any significant length of time. Amenorrhoea due to weight restriction is only evident in a very small minority of top junior athletes, and in cases of severe eating disorders (Polivey et.al. 1986). Furthermore, in such cases weight loss is not the controlling factor (Garn et.al. 1983).

Adaptive Reproductive Suppression by weight control could only be applicable to Western culture if it is an innate behavioural response that is dependent on cues of potential stress that are sufficient indicators of the level of stress associated with child rearing across the social and ecological conditions faced by ancestral hominids, and are still accurate in contemporary Western culture. This is clearly not the case. Contrary to the predictions of Anderson et.al. (1992), it is evident that girls in Western culture tend not to diet in order to impede their normal hormonal weight gain trajectory prior to menarche. A few start during their late adolescence, but most women do not start dieting until their early twenties (See Chapter One, pg. 5). Additionally, Eveleth and Tanner (1979) and Tanner (1973) observe that the average age of menarche in America and seven countries of Western Europe has declined greatly from what it was one hundred and twenty years ago. For example, in the mid 1840's the average Norwegian girl began menstruating at seventeen, today she is just over thirteen years of age. This downward trend appears to be leveling off, in the case of most countries sampled. However, no significant shift in Western cultural attitude or behaviour has been noted that suggest adolescent sexuality has become any less stressful over this period.

3.2.4. *Battle of the Sexes*

Anderson et.al. (1992) consider the biological functions of female body fat to have had differing implications for ancestral male and female reproductive success. They suggest that the dominant sex will impose its preferences in any given society. The authors claim that the relationship between the relative social dominance of the sexes and the standard of beauty can go in either of two directions:

a) The ***Type One*** relationship assumes a conflict between the male sexual preference for female body fat and *Adaptive Reproductive Suppression* by females. In patriarchal cultures, the men impose their preferences for fatter women as the standard of beauty because this serves to increase their reproductive success. In matriarchal societies, where *Adaptive Reproductive Suppression* is expected to increases their reproductive success, women assert a thin ideal.

b) For the ***Type Two*** relationship the conflict arises due to competition between men and women for food when supply is inadequate. Where males dominate they impose their reproductive interests on women by expecting them to pass food on to them and their children. In such a society slenderness is perceived as physically attractive in women as it is an indicator of self denial. The converse is true in matriarchal societies. Messer (1989) discuses several cultures where thinness is perceived as attractive in women, and this is linked to cultural beliefs that self denial is virtuous. The example Anderson et.al. (1992) quote is the American native Indian. Traditionally in their highly male dominated culture women are expected to offer food first to men, then children, eat less, and away from home. During periods of hardship, women and girls are often totally deprived of food so the males may benefit. Thin women are perceived as attractive in Indian culture. In most of the cultures Messer (1989) introduces, self denial is

valued in both females and males. However, within all the cultures she considers males are the dominant sex.

Anderson et.al.(1992) assessed the comparative level of sexual dominance for each culture in their sample, by the degree to which males were expected to dominate their wives, the value placed on male aggression, strength and sexual potency, the value of female life and work and the comparative choice each sex has in the selection of a potential bride or groom. They conclude that because they found a positive correlation between female social dominance and a slim standard of beauty the *Type Two* hypothesis was not supported, but that the data ~~was~~ were consistent with a *Type One* relationship. The authors claim that a *Type One* relationship is responsible for the idealisation of a thin body shape in Western society. It does appear that the thin ideal has developed concurrently with the increasing social mobility and influence of women in Western society (Bardo 1990). However, Western culture is still far from matriarchal (Hesse-Biber 1991).

data = plural
results

Anderson et.al. (1992) realise that in addition to the comparative social dominance of each sex in a culture, where male and female reproductive interests diverge, male sexual preferences can be expected to concur with female reproductive interests if they outweigh the reproductive advantages of a male selection interest or female intrasexual competition. They argue that in such a situation, men may benefit more from women managing their bodies in a way that enables them to adjust timing of reproductive effort in response to varying social conditions, than from women conforming to the males' reproductive interests. Anderson et.al. (1992) realise that male sexual selection is more likely to concur with the reproductive interests of the female in monogamous species than polygamous, because the male and the female invest similarly in their offspring. However, it is evident from section 3.2.3. that reproductive

suppression through weight restriction is not advantageous in modern Western culture and is unlikely to have evolved ancestrally.

3.2.5. *Kirche, Kuche, Kinder*

The last socioecological factor Andeson et.al. (1992) believed to influence existing cultural variations in the level of female body fat perceived as physically attractive, is the degree to which females can enhance their reproductive success though resource acquisition (*Kirche, Kuche, Kinder*). They argue that this is the case if, for example, a woman's work improves the probability for survival of her offspring, or the resources earned could be collected over a long period to benefit future children. Andeson et.al. (1992) claim that in cultures where females can enhance reproductive success through economic activity, and if pregnancy and child rearing are incompatible with this activity, a slim standard of beauty is likely to evolve. A female can then sustain economic activity by *Adaptive Reproductive Suppression* until a threshold is reached where the costs of economic activity to fertility outweigh its reproductive advantage. Anderson et.al. (1992) make no prediction concerning the direction male sexual preferences will take. They believe they found evidence for the *Kirche, Kuche, Kinder* factor. While, in their sample, cultural values for female labor did not significantly correlate with the female beauty standard, menstrual taboos did. They argue that because menstrual taboos restrict the time and situation in which women can work, the level of restriction they impose is a measure of the opportunity women are given to work.

Anderson et.al. (1992) suggest *Kirche, Kuche, Kinder* is one more reason why slenderness is becoming increasingly idealised in modern Western culture. They claim this is highlighted by the growing political and personal issues concerning the difficulties women face by trying to integrate the frequently incompatible roles required of motherhood and vocational

success in twentieth century Western society. The validity of *Kirche, Kuche, Kinder* as an influencing factor in modern Western culture rests upon three flawed assumptions: that reproductive suppression by weight restriction is practiced in Western society, that female access to economic resources, through work, is a phenomenon that has existed in the West long enough to significantly influence human evolution (Hesse-Biber 1991), and that female economic activity enhances reproductive success. It is evident resource acquisition impedes female reproductive success in contemporary Western culture (Chapter Two, pg. 52-55). Additionally, the research reviewed in Chapter Two (pg. 49-52) suggests that when resource status increased reproductive success, rather than face the reproductive costs of extended economic activity, human females evolved a selection preference for the resource potential of a potential sexual partner.

3.2.6. *Social Status* and *Career Value*

Smuts (1992) like Anderson et.al. (1992) holds more than one factor responsible for the contemporary Western female beauty standard. He analysed this ideal theoretically as a biologically mediated response to two ecological novelties: chronic food surplus and the removal of cultural barriers between men's and women's economic roles. His main focus was to illustrate the importance of recognising the adaptive flexibility of human behaviour to find adaptive solutions to novel problems, not only created by ecological change but also by cultural change. Smuts (1992) advocates a Dual Inheritance conception of human nature.

He argues that throughout most of human evolution, food has been a scarcity. Because of this, the ability to accumulate body fat indicated access to valuable resources not universally available. However, due to the life style and chronic surplus of food in modern Western society, Smuts (1992) recognises that as fat did in the past, thinness today requires considerable

investment and economic resources to be able to overcome the powerful physiological and behavioural mechanisms designed to accumulate calorie reserves. Smuts (1992) argues that as fat has been associated with wealth for humans inhabiting harsh ecological environments (Messer 1989), in conditions of plenty, female thinness is used as a display of wealth to attract potential mates. He points out that thinness alone is not a reliable indicator of status, as it is impossible to distinguish between those who are thin by choice, and those from necessity and it is more easily simulated than conspicuous consumption or social dominance for example, typical indicators of status in males. Therefore, the best way for a woman to display high status is by combining thinness with expensive dress and adornment.

Smuts (1992) concludes that female slenderness is not only idealised in Western culture as it is an indicator of social status, but also as an indicator of career value. Smuts (1992), like Anderson et.al.(1992), proposes that one socioecological factor responsible for the contemporary Western female ideal is the increasing empowerment of women to acquire resources through economic activity. Smuts (1992) claims that thinness in a woman displays that she has the kind of motivation, self-control, and persistence that vocational success in Western culture demands. This, he argues, is because women's bodies tend to accumulate body fat more readily than do males', and loosing weight becomes even harder for women with advancing years. Additionally, while physical exertion translates into increased muscle mass for males, it contributes little to muscle mass, but improves the tone of a women's body. Smuts (1992) argues that thinness has translated into a male sexual preferences as hard work, high motivation and resource potential are also reproductively advantageous in a wife.

Smuts (1992) proposes that the valid complaints of Naomi Wolf and other feminists, that thin women are provided with better job opportunities because men judge women by their looks, overlooks the possibility that slenderness is advantageous because it is a measure of career value. He

highlights the steady decline in ideal female body weight and the rising epidemic of anorexia nervosa in recent decades and argues that as a display of motivation and determination, thinness has no clear limit short of disabling health effects. Smuts (1992) also claims that his theory is consistent with the evidence that women tend to want to be thinner than the ideal presented by men. He goes on to suggests that middle and upper class American females become thinner than lower-class females only after puberty because this marks the approximate beginnings of serious preparation for career competition.

Smuts (1992) wrongly assumes, like Anderson et.al. (1992), that female economic activity and socioeconomic status increase reproductive success in contemporary Western culture. Additionally, the research discussed in Chapter Two (pg. 49-52) suggests that males show less interest in cues of resources or its potential in a prospective mate than their female counterparts. The human male is in a better position to maximise his reproductive success by selecting the healthiest mate. It is the female who can increase her reproductive success by selecting a mate with resources. For this reason, displays of social status and resource potential are the preferred reproductive strategies of the male.

3.3. Weight Control: A Deceptive Reproductive Strategy

Singh (1993a,b) argues that the contemporary Western female beauty standard does conform to evolutionary principles in that a gluteofemoral body fat distribution is perceived as physically attractive. He presents evidence, already discussed, that a gluteofemoral body fat distribution is advantageous for women, due to its relationship with reproductive endocrinological status (pg. 69) and long-term health risks (pg. 76-77). Singh claims that a gluteofemoral fat distribution presents two additional selective advantages for males: It is orientation independent, as it remains constant when viewed from the front, behind, or side and it reduces the chances of being cuckolded, because pregnancy dramatically alters the waist line, increasing perceived abdominal fat. He argues that gynoid and android fat distributions can be expressed by measuring the waist (narrowest point between the lowest rib and the iliac crest), and hip (at the level of the greatest protrusion of the buttock) circumferences, and then calculating the waist to hip ratio (**W.H.R.**). Singh (1993a,b) claims W.H.R. reflects both the distribution of fat between upper and lower body and the relative amount of intra- versus extra-abdominal fat. Using W.H.R. as a measure of gluteofemoral body fat distribution, Singh (1993a) conducted a number of studies to show that modern Western people perceive a gluteofemoral body fat distribution to be attractive.

Singh (1993a) reviewed the available anthropometric data on *Miss America Pageant* contestants, *Playboy* centrefolds and British fashion models. He relied mainly on the data published with the research articles discussed in Chapter One (pg. 2-4), but did include some additional data he collected himself. He concludes that although the level of body fat, for *Miss*

America Pageant contestants, *Playboy* centrefolds and British fashion models, showed a substantial decline over the last thirty to forty years, the average W.H.R. for these groups showed a considerably less pronounced shift and remained within a range considered healthy. However, Singh is forced to recognise that these icons of female appearance are being increasingly selected with a less pronounced gluteofemoral body fat distribution and a more tubular appearance.

To establish that a female body fat distribution is a critical feature for perceived physical attractiveness, Singh (1993a) conducted an experiment, using a sample of American college men, where he was able to systematically manipulate W.H.R. He used twelve line drawings of female figures as stimulus material. These he categorised into four levels of W.H.R. and three levels of body weight, normal, under, and over weight (Figure 3.2.). Singh (1993a) found that the students tended to rank those representing a low W.H.R. (a pronounced gluteofemoral body fat distribution) as the most physically attractive, sexy, youthful, healthy, and fertile. This effect was produced across all three body weight categories. Out of the three body weight categories subjects tended to rank the normal weight figures as the most physically attractive, healthy, sexy, and fertile and the over-weight as the least. However, they ranked the under-weight figures as the youngest. The stimuli figures W.H.R and body weight had an equivalent influence on the perceptions of subject of differing body weights.

A multidimenshonal unfolding analysis revealed that perceptions of attractiveness, sexiness and health were located together in their own solution space, suggesting these judgments are related. The desire and capability to have children each figure was perceived to have, were also located together, but not with attractiveness, sexiness and health. Youth was the only variable located in its own solution space.

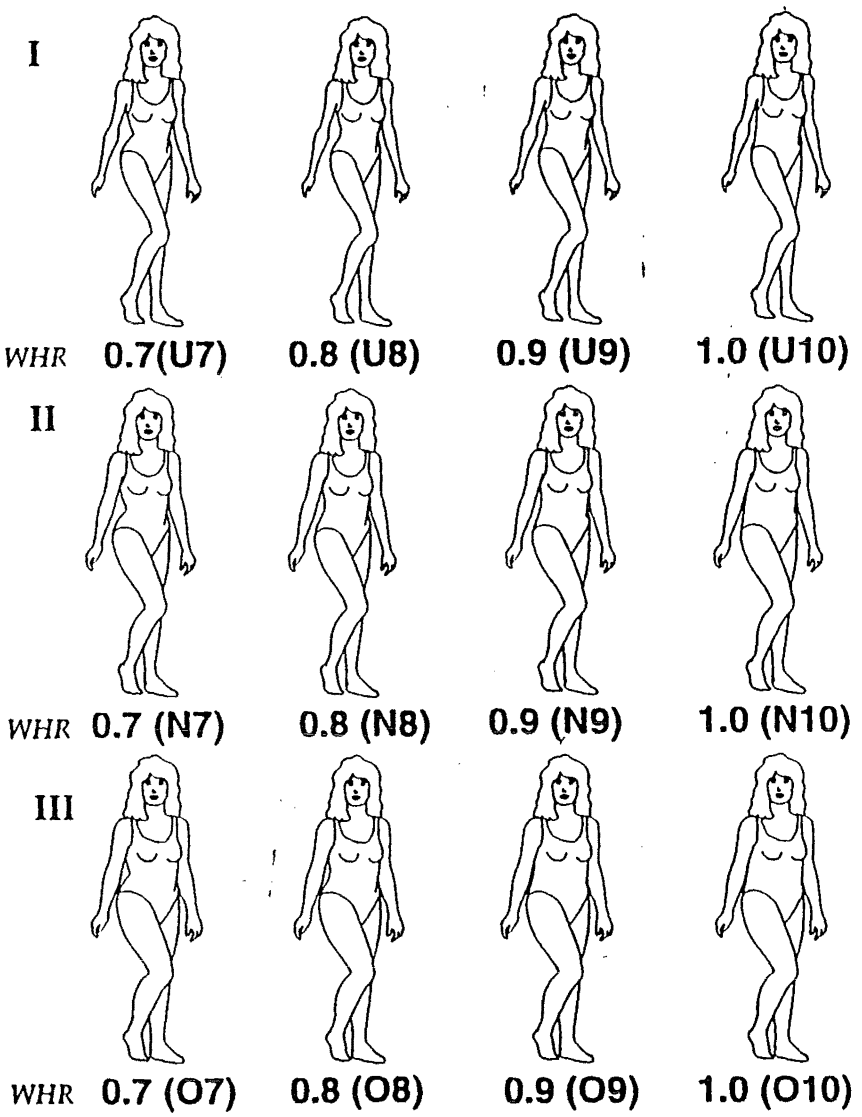

Figure 3.2: Figures representing three body weight categories, under (I), normal (II), and over (III). The W.H.R. are shown under each figures along with a letter and a number in parenthesis to identify weight category and W.H.R (Singh 1993 a).

Singh (1993a) replicated this experiment using a sample of twenty-five to eighty-five year old males representing a wide range of educational and socioeconomic status. The results were, in all respects, similar to the earlier study, and no age effect was detectable. Once again Singh (1993b) replicated the same experiment using a new sample. Published with these additional findings is a more detailed evolutionary analysis of his results. The research methodologies employed for these experiments are much the same as those in his earlier paper. The only real differences are the inclusion of a sample of American female college students and older working women, and a request for the subjects to indicate the perceived chronological age of each stimulus figure. Singh's (1993b) results matched those of his earlier studies. The only sex difference found was that females ranked the normal and under weight figures as equally attractive, while men ranked the normal weight figures as the most attractive. He also found that, on average, irrelevant of W.H.R., the under weight figures were perceived to be between seventeen and nineteen years old, the normal weight figures to be between twenty three and twenty six, and the over weight figures as between thirty one and thirty three years old.

In accord with the previous research discussed in Chapter One (pg. 4-5), Singh's (1993a,b) data do show that male perceptions of female attractiveness does not reflect the ideal portrayed in the media. However, contrary to the previous research, in Singh's (1993a,b) experiments, females considered normal and under weight figures equally attractive. The evolutionary principles discussed in Chapter Two (pg. 55-63) predict, as was found in all of Singh's (1993a,b) experiments, female physical attractiveness to be closely linked to perception of health. Unexpectedly, perceived youth was not as closely linked to physical attractiveness. Also, contrary to predictions, perceived sexual attractiveness was no more closely related than physical attractiveness to perceptions or indicators of fertility. Furthermore, the figures representing a low W.H.R were recognised as the most fertile as expected, but the plump figures were not. However, because subjects

perceived the normal weight figures to be in their late twenties and the figure in this weight category with the lowest W.H.R. as the most attractive of all the stimuli, this suggests, contrary to the dominant mating system, generally Western males do seek to maximise the fertility of their partners (Chapter Two, pg. 59-61).

Conceivably, these mixed results are a function of the artificiality of the stimuli Singh (1993a,b) employed. For example, subjects could find making personal judgments from outline figures difficult or offensive, the charicatures used could translate some kind of loading caused by the artist's pre-conceptions, or the figures could inaccurately portray each weight category. Singh (1993a) did conduct a pilot study to ensure the figures represented each body weight categories they were placed in. He found that nearly all of the seventy-two subjects he used assigned the same figures to the three categories as designated by the experimenter. This does not necessarily show that the stimuli represent all the qualities of female body fat that influence people's judgments, only that the stimuli figures exhibit sufficient qualities to distinguish their body weight in respect to one another. If this is a confounding factor, because male perceptions of female body shape have been inferred so far from studies using line drawings and silhouettes, it is for this reason they have failed to match with female perceptions, cosmetic behaviour and prevailing normalising images (Chapter One, pg. 4-5).

Singh (1993b) concludes from his findings that body fat plays an important role in people's perceptions of a female's age. He suggests that the quest for youth in American society could explain the shift from a plump ideal to the idealisation of an increasingly thin female body shape. For the remainder of this chapter, these considerations are expatiated and developed into a proposal for the sequence of evolution that influenced the idealisation of thin women in contemporary Western culture.

It is because female body fat is a salient and was a just indicator of age that males evolved the propensity to infer the age of a potential mate from body fat and its influence on outline.[1] Singh's (1993a,b) experiments suggest that Western males do accurately infer age from the assumed effect of body fat on the general outline, but are insensitive to its supposed influence on the comparative waist and hip distribution of fat. Winick (1981) explains that the first critical period of development, where males and females significantly diverge, is early adolescence. In females the growth spurt begins between eight to eleven years of age, typically two years before males. It is from this point they start to out grow them. During this period females start to accumulate subcutaneous body fat, depositing it primarily around their hips, buttocks, breasts, and the tops of their arms.

Garn et.al. (1983) and Tanner (1973) observe that this pattern becomes more tenacious with the onset of puberty because of its relationship with endocrine hormone levels. Therefore, accompanying the primary sexual developments that marks this period of change for females (such as the growth of pubic hair, labia enlargement, and the elevation of the areola and nipples) come significant changes in body shape. Tanner (1973) states that as the female moves through puberty the leg line becomes curved, breasts fill, hips widen, and a high waist line typically develops as the trunk lengthens. Upon reaching late adolescence pubic hair has fully developed, breasts attain their adult form, and the menstrual cycle is established. Growth in height decelerates. Weight gain also drops off and as it stabilises, the waist line drops (Figure 3.3.). Kaluger and Kaluger (1979) point out that females continue to accumulate body fat until well into their fifties. This is primarily due to the continued decline (approximately at a rate of five percent per year) of the metabolic system from around twenty years of age and onwards.

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[1] Caro and Sellen (1990) illustrate that female body fat has a salient and direct influence on the outline when viewed from the front or behind.

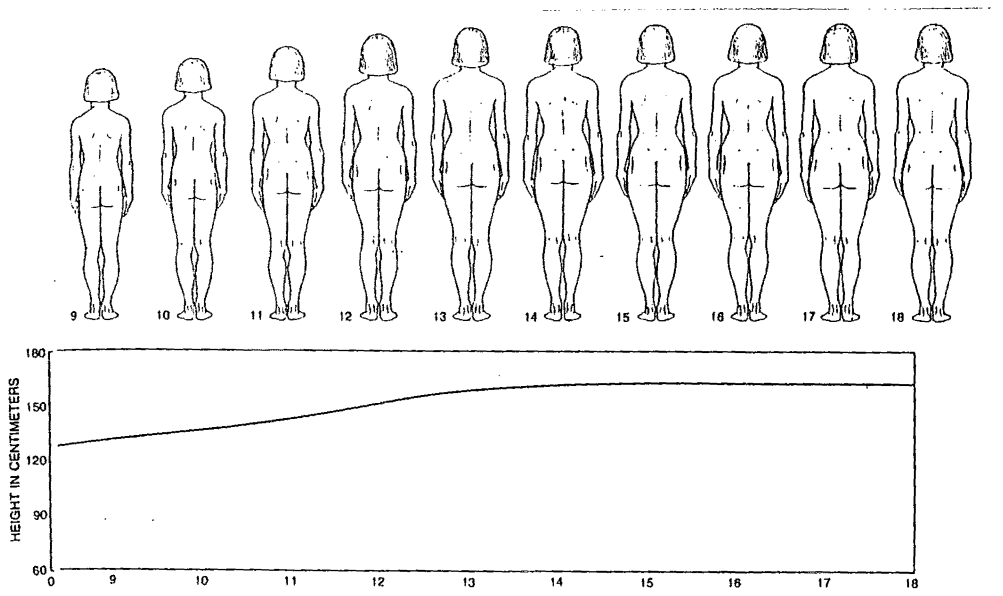


Figure 3.3: The changes in body shape of the average North American/European female as she develops through puberty (Adapted from Tanner 1973).

With the transition to monogamy, in early Western culture, males who maximised their mate's reproductive value were at a selective advantage (Chapter Two, pg. 45-46 and 72-73). Therefore, an increased preference evolved for the thinner and more compact body form indicative of late adolescence. However, this selection preference was likely to have been restrained by the remaining reproductive advantages of female body fat when food supply was uncertain.

The evolved selection preference for youth which the shift to monogamy entailed, is reflected in the differences between the pictures of the early Pliocene statuettes published in Beller (1977) and Renaissance depictions of cult figures of beauty such as Botticelli's *Venus* (Chapter One, pg. 8-9). Although still plump, the Renaissance artists typically painted

figures which were more compact and with less developed breasts than the statuettes shaped by early Pliocene hominids. These examples represent only two select periods in history. If it were possible to construct an archive of the artistic renditions of Western cultural icons of female beauty of the time, from the earliest recorded examples through to the Renaissance, it could be established if they are indicative of a general pattern. Additionally, the period of transition to monogamy in Western culture could be inferred from the female beauty standard reflected in these pictures.

The dramatic increase in numbers and the empowerment of the young, partly due to the post-war baby boom, and the exploitation of this new and lucrative market by industry and media placed an increasing emphasis on youth in contemporary Western culture (Hesse-Biber 1991). This social climate, it seems, caused a respective shift of emphasis in male sexual preferences. More value was placed on the cues which Western males had evolved a sensitivity to, of a potential mate's youth e.g. a thin and compact body shape.

Female slenderness is idealised to such a degree in Western culture that it implicates serious health costs because of the evolution of a deceptive reproductive strategy that employs weight control to falsely advertise a youthful body. Restricting the normal developmental cycle of body fat accumulation leads to the retention of a youthful body shape i.e. compact, small hips, buttocks, breasts, and thin arms. This holds appeal for women as it is one way to retain youth and the value that is placed on it in Western culture. This strategy also advantages the female through preferential sexual selection. Sobal and Stunkard (1989) review one hundred and forty-four studies of the relationship between socioeconomic status and body fat. They conclude that a strong inverse correlation between socioeconomic status and obesity exists for women in developed nations, but not for men. They found the leading variable responsible for this relationship was the role thinness played in social mobility for women in Western cultures through marriage.

Dietary restraint, physically activity and inheritance were the other influential variables they observed, however, the influence these variables had is less consistent.

This strategy is clearly not the product of natural selection for two reasons: Firstly, it is unlikely the mating advantage weight control provides outweighs the reproductive costs of being so under weight. Especially considering that attracting a high status male reduces reproductive success, as there is an inverse correlation between social status and reproductive success in twentieth century Western culture (Chapter Two, pg. 52-55). Secondly, the factors that could of led to its expression are too recent. Therefore, as an evolutionary phenomenon this strategy could only be the product of Dual Inheritance; possibly the expression of the interaction between an epigenetic rule and the contemporary Western cultural context.

The epigenetic rule involved provides the disposition to copy effective reproductive strategies. This rule evolved through natural selection because it allowed the individual to adjust rapidly to the different advantages certain reproductive strategies implicated, in varying social and ecological conditions (Chapter Five, pg. 117). The Mass Copying Model proposed by Kirkpatrick and Dugatkin (1994) seems to provide the most plausible process of transmission, as this process generates the kind of positive feedback that enables the selected strategy to evolve to the most extreme values. The Mass Copying model stipulates that immature females observe and emulate the reproductive preferences of any observable, more mature, female. Copying the reproductive strategies of elders, Kirkpatrick and Dugatkin (1994) point out, is evident in many animal species, arguably due to the responsive flexibility this enables.

The particular cultural antecedents for the adoption of weight control as a deceptive reproductive strategy appear to have originated from the Victorian era. Polivey et.al. (1986) state that it was during this period in

history the aristocracy first learned to control the female body shape to emulate a young and so more attractive, body form; The corset was invented and made fashionable by the upper class. Medical science up to this point in history was primitive, and therefore a lack of awareness over the particular effects nutrition and exercise has on the body prevailed. It was for this reason that external means of control were turned to. Polivey et.al. (1986) explain that the corset was a close fitting undergarment worn to compress the body to produce a compact body outline and enhance a slender waist. Singh (1993a) argues that this accentuated a gluteofemoral body fat distribution. The design and shape suggest its effect was not only to accentuate the waist, but also to raise and compress the waist line and the breasts. This accentuated the body outline characteristic of a teenager (pg. 93-94).

Hesse-Biber (1991) records that the modern form of capitalism in the West places a higher value on behaviours indicative of self control and productivity. Combined with a rising social awareness of the effects of nutrition and exercise on health and physical development, these cultural values and beliefs led to the adoption of internal controls (e.g. dieting and exercise) to emulate a youthful female body shape.

The theories postulated in this section suggest that increasingly thinner and less curvaceous models are being favoured by the media because low body fat and a compact form exhibit a more youthful and therefore more attractive body shape. Supporting this suggestion Silverstein et.al. (1986) found that female media images are perceived to be younger than they were in the past, and younger than their male equivalents. The deceptive reproductive strategy theory of weight control explains the pattern of female weight restriction evident in contemporary Western culture (Chapter One, pg. 5-6). As predicted by this theory, women normally start dieting after their mid teen years. This is when it becomes necessary to impair the normal cycle of adiposity gain with age to retain a youthful figure. It is evident

those proportions sought to be controlled by weight restriction are those associated with this hormonal fat gain trajectory, i.e. hips, buttocks and general tone (leading to a less fat and more compact form).

Women, usually married, continue to control their weight well into their forties. This pattern exists to retain physical attractiveness. There are two possible reasons for this: It is a contemporary manifestation of an evolved disposition because continued attractiveness has been advantageous for human females since the early Pleistocene epoch to ensure food supply and retain the interests of the selected mate (Chapter Two, pg 44), it is beneficial for short-term mating (Chapter Two, pg 55-63). See note

Although the dominant mating system in Western culture is monogamous, it is facultative, and therefore individuals are expected to not only seek a long-term relationship but also to engage in short-term matings (Chapter Two, pg. 55-63). Males seeking short-term matings will be advantaged if they select the most fertile women available. Because well rounded breasts, buttocks and thighs indicate the established fat gain trajectory of a woman of peak fertility, they are predicted to be perceived as a better prospect for a short-term mate and as more sexually attractive than a thinner female (Chapter Two, pg. 63). *Playboy* centrefolds are unique in that they are exploited specifically for their immediate sexual appeal (Chapter Two, pg 57-58). The more pronounced gluteofemoral fat distribution that this group has retained over the last ten years, compared to *Miss America Pageant* contestants and fashion models (Chapter One, pg. 2-4), possibly reflects the greater sexual appeal of an established body fat distribution. However, contrary to the prediction that males are more sensitive to the assumed effect of age on general body fat than distribution, this group has over the last ten years been increasingly selected for lower levels of body fat, compared to *Miss America Pageant* contestants.

If males do differ in the levels of body fat they find attractive depending on the reproductive tactic they intend to use, this does not imply that once married, a female should gain weight to appear more attractive for a short-term mating. Although this would advantage her in attracting a short-term mate with superior genes it would be to costly in a monogamous species because she would lose the interests of her husband.

Clearly, the co-evolutionary conception of the modern Western beauty standard postulated in this section implicates a number of assumptions and predictions that remain to be tested. The following empirical study was designed to establish whether peoples' perception of women accord with these assumptions and predictions. It is argued in Chapter Three (pg. 92) that research, to date, which directly examines males' perceptions of the female body shape perceived physically attractive, are distorted by the artificiality of the stimuli material used. Therefore, it was hypothesised that the use of more realistic images would elicit responses in accordance with the predicted male sexual preferences and the deceptive reproductive strategy theory of weight control in the following respects:

1) The thinner a female is, the younger males and females will perceive her to be.

2) The thinner a female is, the more physically attractive males and females will perceive her to be.

3) The thinner a female is, the more likely she will be preferred, by males, as a long-term sexual partner than as a short-term sexual partner.

The Experiment

4.1. Method

4.1.1. Subjects

One hundred and twenty-four University of Canterbury stage one psychology students volunteered to take part in this study. The sample consisted of a total of fifty-eight males and sixty six females. The majority of this group were of European descent. Of the remaining, five were Maori, five Asian, and four did not consider themselves to fit into any of the categories provided. Ages ranged from seventeen to forty five with a mean of twenty two. The sample was heavily skewed, $m_2 = +1.8$. Only heterosexual subjects were included in the analysis, as a sufficient sample of homosexual subjects was not available: Only one homosexual reported.

4.1.2. Materials

Stimuli: The stimuli consisted of ten full body somatotype black and white photographs of women standing naked and with all head features obscured. The images were presented on an A3 sheet of paper, thus enabling the subjects to easily compare the figures with one another (Appendix A). These pictures were derived from an article written by Loates (1992) that was published in the popular magazine ***More (N.Z.)***. This particular source was chosen for four reasons: Firstly, photographic or printing techniques had not been specifically employed to improve the figures' appearance. Secondly, the sample consisted of a cross section of fecund women's body types: the ages of the stimulus figures ranged from nineteen to thirty seven years, their weights from fifty three kilograms to eighty four kilograms, and their heights between 1.59 meters and 1.74 meters tall. Thirdly, published

with the figures were relevant anthropometric measurements. Finally, because the chronological age of the stimulus figures did not significantly correlate with their B.M.I. (rho = -0.12, n.s.).

For the purposes of this study **Body Mass Index (B.M.I)** was used as the measure of body fat. It is calculated by the formula: weight/height^2. Although it is not as precise a predictor of body composition as densitometry, isotope dilution, or electrical impedence, it has proved to be an accessible and accurate measure of body adiposity (Rolland-Cachera 1993, also see pg. 113). Additionally, B.M.I. is a particularly relevant measure for this study because it can be used to compare individuals across age categories as it takes into account height and because it reflects perceived differences in body shape and tone (Rolland-Cachera 1993). The B.M.I. of the stimuli figures ranged between 18.6 and 31.2.

A pilot study administered, to twenty five stage two psychology students, to practice and test the procedure and materials to be used in the full scale study showed that the chronological age of the figures, represented by the original photographs, significantly correlated with their perceived ages. Clearly, the subjects were sensitive to another cue(s) of age, than body fat, that were discernible from the photographs. Informal questioning of some of the subjects involved in the pilot study suggested that some of the figures showed clear signs of aging through skin blemishes, folds and sagging (Appendix B). To control these confounding variables the photographs were digitally scanned onto a computer. In ***Adobe Photoshop™ Macintosh*** version ***2.5.1.*** using the *blurring* function, it was possible to flatten the form of all the distinguishing characteristics within the body's outline. After the modification the condition of the epidermis across all ten figures appeared uniform. This manipulation effectively removed any visible cues to age evident on the skin of the stimulus figures (pg. 110).

Measure: The measure took the form of an anonymous questionnaire incorporating similar items to those used by Singh (1993a,b). Changes were made, once again in light of the informal questioning of some subjects involved in the pilot study and on the advise of the ethics committee, to improve the clarity and sensitivity of the items, and to tailor the questionnaire to address the particular hypothesis of this paper (Appendix C).[2] The cover page of the questionnaire solely functioned as an information sheet. Readers were informed that this was a study on body types and personal judgments and that the research is specifically intended to find out what factors influenced people when making personal judgments from full body photographs in the absence of facial cues. The subjects were also given some idea of what was required and were told participation was voluntary and anonymous. On the second page subjects were required to state their age, sex, height, weight, sexual identity and ethnicity.

The measuring instrument consisted of fourteen statements for each picture. Subjects were required to indicate on a five point Likert scale the extent to which they strongly agreed or disagreed with each statement. A score of one would mean the subject strongly agreed and a score of five would indicate strong disagreement. The statements, from which responses would be analysed, were in order of appearance; Healthy (*Healthy*), Youthful looking (*Youth*), Wishes to have children (*Wish*), Faithful (*Faith*), Capable of having many children (*Capable*), Sexually experienced (*Experienced*), Physically attractive (*Attractive*), Sexy (*Sexy*). There was a total of six distracters mixed in with these statements. These were statements such as ambitious, career orientated, good sense of humour, and aggressive. Additionally, subjects were asked to indicate the likelihood they would choose each figure for a hypothetical long-term (*Long*) and short-term (*Short*) sexual relationship. For this item, and the last two statements, the subject were told that if they were not personally attracted to the sex of

[2] This study was given the approval of the human ethics committee, standing for the University of Canterbury, on the 22nd December, 1994

the stimulus, to judge on the basis of how they thought someone who is attracted to this sex would respond.

4.1.3. Procedure

The study was administered at the beginning of the subjects' first term of 1995, at university. While the questionnaire was being handed out, participants were told that the study was on a rather sensitive issue, and it was highlighted that participation was voluntary. Each subject was provided with a stimuli sheet and a questionnaire. Those who chose to participate were required to complete the questionnaire before their laboratory class began. They were also told that, once completed, they should return the sheet of photographs to the administrator and place their own questionnaire in a box at the front of the room as this would ensure anonymity.

Mixed in with the main questionnaire were a small number using males as stimuli. This was done on the recommendation of Dr C. Bulik, Senior Lecturer in Psychology at the University of Canterbury. The rationale behind the inclusion of male stimuli material was to avoid presenting to subjects the distinction that personal judgments can be made of women from their physical appearance, but not of men. The stimuli material consisted of ten male nude photographs similar in style to the female stimuli sheet. The male figures were also published in ***More (N.Z.)***, one year after the female figures (Huggett 1993). The questionnaire was the same as the one pertaining to females, except for the change of sex. Participants were informed that they would be looking at male figures. The data from these questionnaires was not intended for analysis.

4.2. Results

4.2.1. Analysis

The **Pearson Product-Moment Correlation (r)** was used to determine the degree of linear relationship between the stimuli figure's Body Mass Index (*B.M.I.*) and the subject's responses on each of the ten applicable dimensions. Rather than work from the correlations between the mean value on each dimension and *B.M.I.* with nine degrees of freedom, the correlational analysis was done for each subject individually. The mean of these correlations was then calculated for each dimension. From this point the analysis became a conventional two-tailed test of significance against the null hypothesis, of a mean of zero, with one hundred and twenty three degrees of freedom (Hinkle, Wiersma and Jurs 1994). This method of analysis was employed because it provided an estimate of individual differences that would not have been possible if the mean ratings for each photograph were correlated with *B.M.I.*

In this analysis, a significant mean, derived from a sample of the size used in this study (Cohen 1988), indicates that a significant relationship exists between the variables in the population. However, the result is still constrained by a small sample of body shapes (ten photographs). Accordingly, a conservative significance criterion was set to reduce the chances of making a *type one* error (Dane 1990). The null hypothesis was rejected only at a less than one percent probability that the result could have occurred by chance.

When treating correlation coefficients as data, certain specialised statistical methods need to be employed for the analysis. Inferential statistics

should not be used directly to define the sampling distribution of correlation coefficients as they assume a normal distribution. Correlation coefficients are restricted to values between negative one and positive one. As a result, the theoretical sampling distribution becomes increasingly skewed to the left for positive values, and to the right for negative values. Hinkle et.al. (1994) recommend taking the hyperbolic arc tangent of a coefficient to redistribute the scores' sampling distribution in a way that allows the true mean of a sample of coefficients to be extracted. Before interpreting the results of central tendency analysis on transformed data, it is facilitative to return the value to its original metric. The appropriate formula to use is as follows[3] :

helpful or facilitative (use the simpler word)

$$\bar{x}_r = \sqrt{\frac{\text{Atanh}(r_1) + \text{Atanh}(r_2) + \ldots\ldots \text{Atanh}(r_n)}{n}}$$

$$= \tanh(r).$$

Hinkle et.al. (1994) also recommend the following test statistic to establish if the mean extracted by the above formula is representative of the population:

$$t = r\sqrt{\frac{n-2}{1-r}}$$

To test the null hypothesis that $p = 0$, the sampling distribution of r can be used. This is because the sampling distribution of the correlation coefficient is approximately normal when r nears zero.

[3] The effect the transformation has on the values attained is to yield an increasingly larger score than that taken from the raw data as the coefficient increases. The results attained from the transformed data as compared to the raw data vary little for values closer to r = 0.

The test statistic implies nothing about the magnitude of the relationship for the hypothetical population, only that it is different from zero. To establish the magnitude, the **confidence interval** must be constructed. Hinkle et.al. (1994) asserts that from the confidence intervals, as computed by the formula below, it can be predicted with a statistical confidence of ninety nine percent, consistent with the accepted level of significance for this study, that the population value will be between these intervals:

$$C.I. = \quad z_r \pm 2.58\,(1/\sqrt{n-3}\,)$$

$$z_1 = r_1 \quad z_2 = r_2$$

The z, symbolises the Fisher z transformation of the r coefficient in question. The **Fisher z transformation** also adjusts the skewed sampling distribution of correlation coefficients, and renders them useable for this type of analysis. The transformation is:

$$z_r = (\tfrac{1}{2}) \log_e (1 + r / 1 - r)$$

4.2.2. Manipulation Check

As predicted, the modification digitising the stimuli photographs enabled, served to remove the other detectible cues to aging evident, apart from body shape. There is no significant relationship between the stimulus figures' chronological age and the subjects' responses on the dimension *Youth* ($\bar{x}$ r = -.00, t = 0, n.s.).

4.2.3. Main Findings

The mean correlation coefficient between the stimulus figure's B.M.I. and the subjects' responses on each of the ten dimensions are summarised in Table 4.1. It is evident that the body shape of the stimulus figure's did have an influence on the subjects' perceptions. A significant mean correlation exists between *B.M.I.* and the subjects' ratings of *Youth*, as hypothesised: The lower the stimuli figure's B.M.I. the younger the subjects tended to rate them. Statistically, there is a ninety nine percent chance that the population value will be between .76 and .47. Also as predicted, the lower the *B.M.I.* the significantly more physically attractive the subjects tended to rate the stimuli figure. A t-test for related measures was conducted (Bruning and Kintz 1987), using the transformed data, to determine the significance of the difference between the mean correlation for *Attractive* and *Youth.* A significantly stronger relationship exists between *B.M.I.* and the dimension *Youth* than with the dimension *Attractive* ($t = -3.22$, $p < .01$, two tailed).

Table 4.1: The mean correlation coefficient between *B.M.I.* and each dimension, the t - value, significance level, standard deviation, confidence interval and the number of useable cases.

	Mean	t - value	Std.D.	C.I.	N
Youth	.64	9.009***	.33	.76 —.47	119
Healthy	.52	6.557***	.38	.67 —.32	118
Attractive	.54	6.880***	.37	.69 —.35	117
Sexy	.53	6.760***	.37	.68 —.34	119
Long	.37	3.963***	.40	.57 —.13	101
Short	.54	6.554***	.36	.7 —.33	101
Faith	-.24	-2.371*	.39		94
Experienced	.24	2.171*	.41		103
Capable	-.21	-2.148*	.40		102
Wish	-.08	-0.786	.43		98

* p<.05 ** p<.01.*** p<.001.

A significant relationship also exists between *B.M.I.* and the subjects ratings on the dimension *Health* and *Sexy*. It appears that the lower *B.M.I.*, the healthier and the sexier the figure tended to be perceived to be. *B.M.I.* is not related to the subjects' responses to *Faith*, *Experienced*, *Capable* or *Wish*.

4.2.4. Sex Differences

The mean correlation coefficients were calculated for each sex separately and are summarised in Table 4.2. To test the third hypothesis, another t-test for related measures was conducted to determine the significance of the difference between the males mean correlations for *Long* and *Short*. Contrary to predictions, these two means do not significantly differ ($t = -.93$, n.s, two-tailed): The B.M.I. of the stimulus figures had an equivalent influence on the male subjects' interest in a long-term and short-term hypothetical sexual relationship. However, the same statistical test, applied to the females, found a significantly higher mean correlation between *B.M.I.* and *Short* than *Long* ($t = -4.35$, $p < .001$, two-tailed). This shows that the females believed female body shape to be more important to males, when judging a potential partner for a short-term relationship, than a long-term relationship.

t-tests were also employed to establish whether any other significant sex differences exist. A simple t-test for the difference between two independent means (Hinkle et.al. 1994), was conducted for each dimension using the transformed data. In each case the Levene's test for Equality of Variances was used to ensure that the variances were equal (Hinkle et.al. 1994). The only dimension where males and females differ in their mean correlation is for *Long*. The females believed males were significantly less influenced by the body shape of a stimulus figure if selecting them as a long-term sexual partner, than males actually were.

Table 4.2: The t -value and significance of the difference between the male and the female mean correlation coefficients for each dimension

	Males	Females	t - value
Youth	.62	.65	.59
Healthy	.53	.50	-.44
Attractive	.54	.54	-.08
Sexy	.51	.55	.65
Long	.51	.23	-3.53***
Short	.56	.52	-.48
Faith	-.24	-.24	.07
Experienced	.23	.25	.27
Capable	-.29	-.15	1.50
Wish	-.17	.01	1.77

* p < .05 ** p < .01. *** p<.001.

Discussion

The study presented in Chapter Four illustrates the role of female body fat in people's perceptions of women, in Western culture. From the results it can be inferred that the thinner a woman is, within the limits of the body sample used, the younger and more physically attractive she is likely to be perceived to be by both males and females. These findings suggest that male and female perceptions of attractiveness conform with the contemporary ideals of female appearance presented in the media (Chapter One). These findings support the argument that it is because of the artificial nature of the stimulus material, previous research using line drawings and silhouettes to determine the female body shape males perceive to be attractive, have not found males perceptions to match female beliefs and cultural ideals.

Within the co-evolutionary framework constructed in Chapter Three (pg. 88-99) males find thinner women physically attractive because they are perceived to be younger. This is because female body fat is an indicator of age, the substantial reproductive advantages gained by monogamous males in selecting a young mate and the increasing value placed on youth and its attributes in contemporary Western culture. With this relationship culturally evolved weight control as a deceptive reproductive strategy: Women learned, that by restricting their normal weight gain trajectory, they were able to retain a youthful, and so more valued and attractive, body form. It is these factors that instigated the idealisation of thin women, and the prevalent pattern of female weight control by dieting and exercise, evident in contemporary Western society.

A significantly closer relationship was found in the present study, between body fat and perceived youth, than between body fat and perceived attractiveness. This is not surprising since all cues of the stimulus figures' perceived age were effectively controlled, apart from body fat. However, the perceived age of each of the stimulus figures was evidently not the only factor that influenced their perceived attractiveness. Singh (1993a,b), Jankowiak et.al. (1992), Buss (1987) and Korthase and Trenholme (1982)

all found the primary determinants of female physical attractiveness to be indicators of youth and health but, in this study, no attempts were made to control the perceived physical well-being of each stimulus figure. This research and the results from the study presented in Chapter Four, implicate perceived health as the extraneous factor.

Contrary to predictions, it appears that the level of female body fat perceived to be attractive by the males in this sample does not differ depending on the reproductive tactic they intend to pursue. The data produced by the present study suggests thinness is desirable in a long-term and short-term sexual partner. Additionally, although males are expected to find plump women more sexually attractive than their thin counterparts (because body fat is an indicator of fertility (Chapter Three, pg. 98)), perceived sexual attractiveness is related, in the same way as physical attractiveness, to body fat. Quinsey et.al. (1993) and Singh (1993a,b) also found little difference between these two judgments. It would appear that Western males have one standard of female physical attractiveness which reflects the expected reproductive interests of a monogamous species: The Western male perception of female physical attractiveness is related to youth in a way that would maximise the reproductive value of a potential mate. This standard of attractiveness is congruent with the prevailing mating system in Western culture.

However males in Western culture do pursue short-term matings. Landolt et.al. (1995), Kenrich et.al. (1990), and Gangested and Simpson (1990) conclude that males had lower personal and physical requirements for a potential partner if a short-term, rather than a long-term, relationship was intended. Symons (1979) argues that a male will benefit from impregnating almost any female if he can avoid further commitment, however, he will benefit from sexual selectivity if commitment is required (Chapter Two, pg. 57). Therefore, it can be concluded that Western males have evolved a perception of female beauty advantageous for long-term

mating, because it is in this situation that selectivity is highly beneficial, rather than for short-term matings, where selectivity is of little importance.

In Chapter Three (pg. 98) it is argued that *Playboy* centrefolds have retained a more pronounced body fat distribution than *Miss America Pageant* contestants and top British fashion models over the last twenty years, due to the different standards of physical attractiveness for short-term and long-term sexual relationships. This claim is not supported by the results of this study.

A female short-term reproductive tactic is only conceivable within the evolutionary program of a monogamous species, if she is in an established pair-bond and is able to cuckold her partner by mating with a phenotypicaly superior mate (Chapter Two, pg. 55-56). It may be that the female subjects used in the present study were misled by their own reproductive tactic, when predicting the impact of female body fat on male preferences for a long-term and short-term sexual relationship. Hence, because the females were aware of the influence of body fat on perceived physical attractiveness, they believed it to be a significantly more influential factor when a male is considering a women for a short-term as compared to long-term sexual partner. They believed it to be of no significant importance for a male when selecting a long-term mate, because it is in the interests of the female to maximise the resource potential of a long-term mate, rather than his phenotypic quality.

Despite advances in science, and an increased public awareness of human physiology, function, and health, the present study suggests that young Western people do not recognise the benefits of female body fat for parturition. Female body fat was not related to the subjects' perceptions of the stimuli figures' capability to have children. In Singh's (1993a,b) experiments, body fat also failed to predict perceptions of capability to have children. Evidently, Western males respond according to one standard of

perceived physical attractiveness, irrelevant of mating context and without an awareness of those physical qualities advantageous for reproductive success. Therefore, it can be concluded that sexual selection by Western males is governed by a general disposition; one that is likely to be genetically bound, because of its dramatic reproductive consequences. Lumsden and Wilson (1985) argue that behavioural patterns with substantial reproductive implications, that are adaptive across a wide spectrum of regularly encountered, social and ecological conditions, are likely to be genetically determined in order to circumvent time needed to learn them, and the chances of error (Chapter One, pg.16-17).

Clearly it is a fallacy of the strain of Evolutionary Psychology promoted by Cosmides and Tooby (1987) that claims all human behaviour is guided by concrete domain specific and complex cognitive inquisition, and discussion making mechanisms designed to interpret the environment of our ancestors. It appears Westerners at least tend to think and behave according to heuristic's (a structure of general behavioural dispositions) particularly in their social behaviour. Fletcher (1990) points out that social psychology has been flooded by research on errors and biases in social judgment that demonstrate that people are subject to a wide range of social judgment biases. Additionally, Fletcher concludes by comparing scientific and commonsense psychological theories that laypersons' theories tend to have a wider range of uses and aims than scientific theories and consist of a more amorphous, flexible, and sprawling set of concepts and models, further suggesting that human thought is not governed by concrete domain-specific mechanisms.

One specific example of Cosmides and Tooby's (1987) broader misconception of human nature is their argument that... *"To confer benefits on kin in accordance with the constraints of kin selection theory the organism must have cognitive programs that allow it to extract certain specific information from its environment: who are its relatives, which kin*

are close and which distant, what are the costs and benefits of an action to itself, to its kin?"(Pg 288). Rustion (1988) and Rustion and Nicholson (1988) found their sample of American couples to behave in accordance with the constraints of kin selection theory, and proved this to operate in mate selection with evidential benefit. In light of this research, Rustion (1988) did not see a need for the domain-specific cognitive mechanisms Cosmides and Tooby (1987) claim to be necessary, to explain this phenomena. Rustion (1988) concludes that humans simply tend to exert a greater preference on those with a greater genetic similarity to themselves. Rustion (1988) went on to propose four general mechanisms that would enable humans to detect genetic similarity: a) innate feature detectors, b) phenotypic matching, c) familiarity or association, and d) location and selective placement. He believes that one or any combination of these features would ensure humans exert preferences for others in a way that would benefit from kin selection.

Another criticism of the conception of human nature proposed by Cosmides and Tooby (1987) that is highlighted in this thesis, is its failure to sufficiently recognise the influence of culture on human behaviour and evolution. Tooby and Cosmides (1992) recognise culture as having its own logics and internal constancy, yet argue it is solely the individual who selects how culture is represented, and how it shall act. However, the power of culture to direct its members' attitudes and behaviours cannot be denied (For example see Myers 1983). Neither can the examples Laland et.al. (1995) and Durham's (1991) review of cultural structures that have influenced the genetic development of its members. It is evident there is no clear distinction between genetic and cultural evolution, both continue to interact in ways that influence one another. Although Blurton-Jones (1990) may be correct in claiming that Evolutionary Psychology, by drawing a clear distinction between genetic evolution in the ancestral past, and the cultural and ecological peculiarities of the present, may facilitate research, it nevertheless presents a false impression of human nature and evolution.

The design of the experiment described in Chapter Four, facilitated the use of more naturalistic stimulus material than has been used before. Although the stimulus sample spans a wide range of levels of body fat, it is nevertheless, very small, and this must attenuate the confidence with which conclusions may be reached from the analysis. Replication of this study is necessary using a much larger sample of body forms.

The theory postulated in Chapter Three (pg. 88-99) rests upon some broader assumptions that are also in need of testing. The status of copying effective reproductive strategies need to be determined as an epigenetic rule. Lumsden and Wilson (1985) suggest a means for establishing epigenetic rules is to look for behavioural central tendencies. They argue that such patterns in behaviour could only reflect universal biases in mental development that are genetically governed. If copying effective reproductive strategies is a behavioural disposition grounded in the genetic constitution of modern females, it should be evident across socioeconomic status, culture, age and demography.

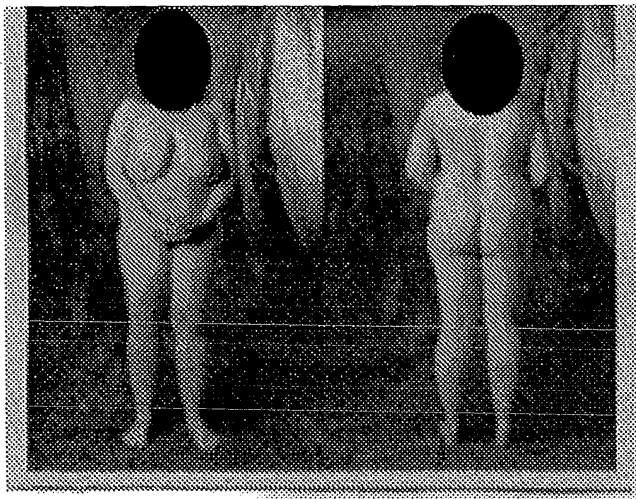
The same methodology can be used to establish whether the Western male's ability to judge age from female body fat is, as predicted, genetically mediated. On an even broader note, it still remains to be tested whether the facultative monogamous mating system adopted in Western society is determined by nature or culture. The resource-based perspective discussed in Chapter Two (pg. 45-48), suggests it is genetically based. If this is the case, existing and known cultures with equal resource distribution should tend to this kind of monogamy.

5.1. Conclusion

Blurton-Jones (1990) remarked that the main weakness of Dual Inheritance theory is the difficulty that arises when attempts are made at modeling and testing it. Since then, Laland et.al.(1995) have illustrated a practical and fruitful method of applying Dual Inheritance theory to human behaviour. They demonstrate the utility of this approach in exploring and explaining the genetic and cultural interaction that led to various manifestations of female infanticide, sex biased abortions and sexual selection. The present research illustrates how, by using similar methodology to that of Laland et.al. (1995), the variety of Dual Inheritance theory postulated by Lumsden and Wilson (1985) can explain a contemporary human behavioural phenomena. Of the explanatory power of various ultimate systems, it is only within Lumsden and Wilson's (1985) system of Dual Inheritance that the influence and interaction of genes and culture is recognised to explain the idealisation of female slenderness and the pattern of female weight control evident in contemporary Western culture. Gould (1995) reminds us of one more fundamental epistemic value, that the survival of a theory in science depends on its fertility; its ability to produce testable hypotheses. It is evident that working within the Dual Inheritance program a concise model of human nature is possible that provides testable hypothesis.

Appendices

Appendix A: Stimulus Material.



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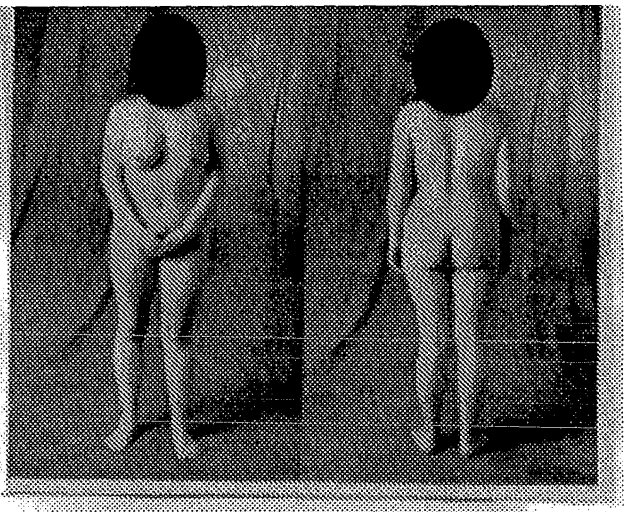

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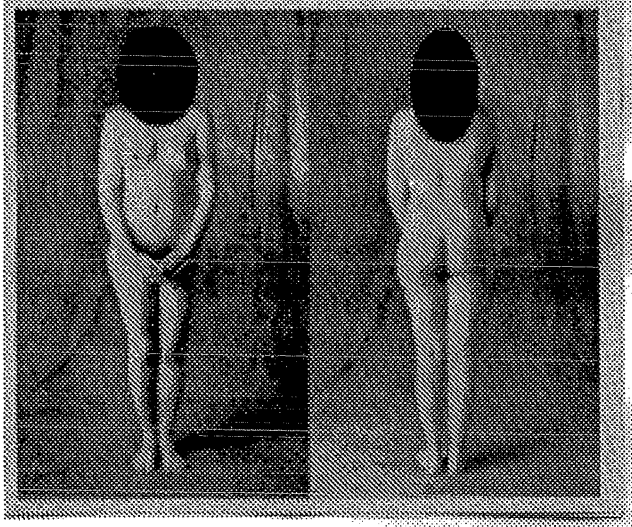

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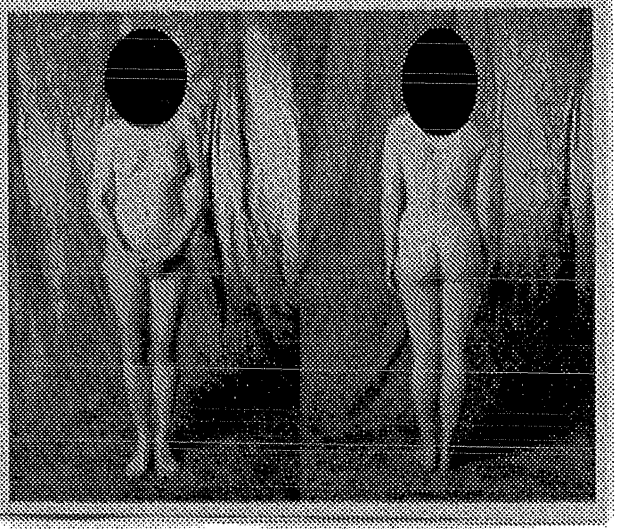

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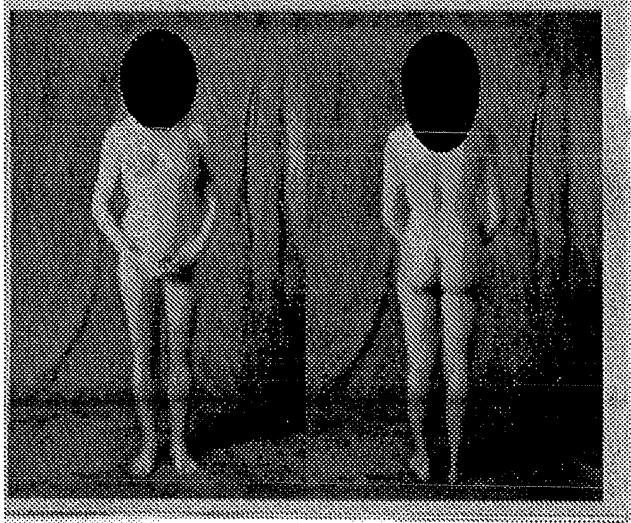

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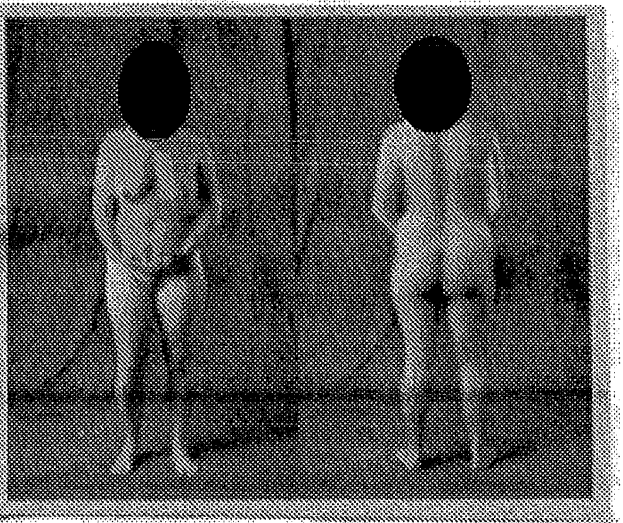

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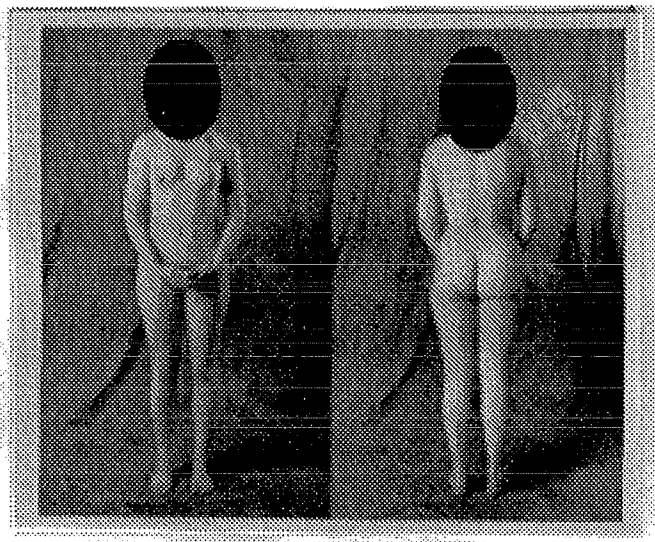

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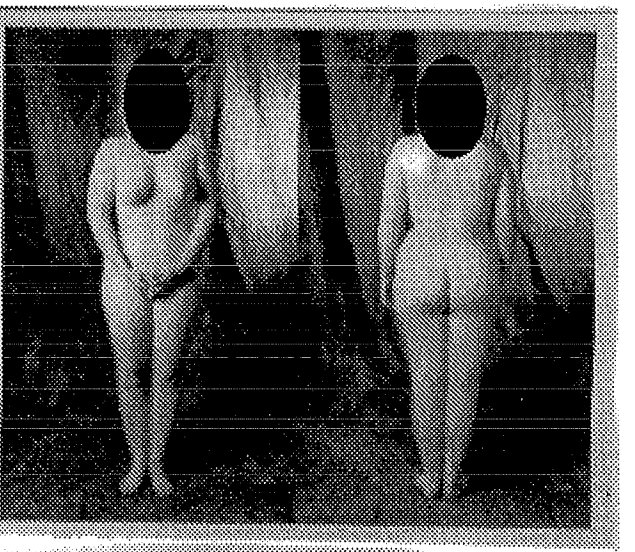

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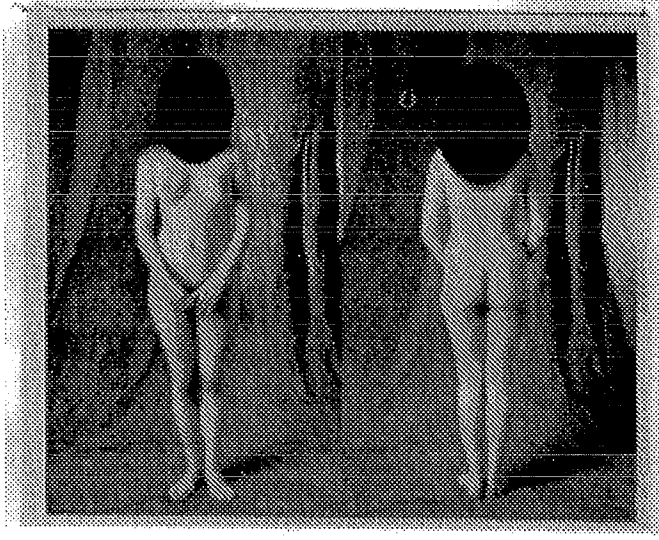

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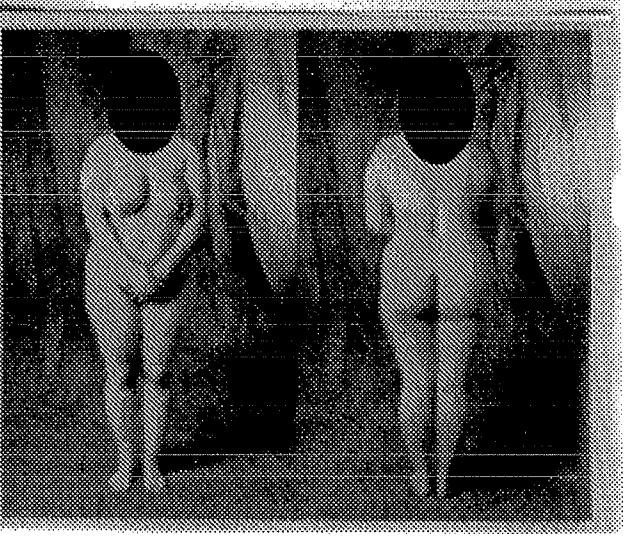

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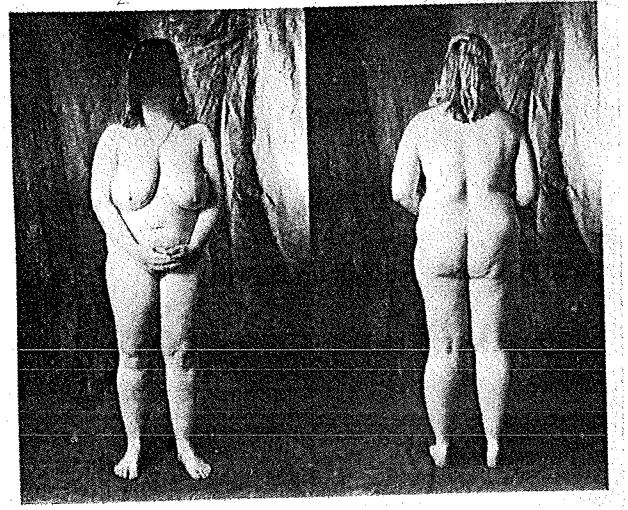
Appendix B: The Original Photographs Published in *More* (1992)



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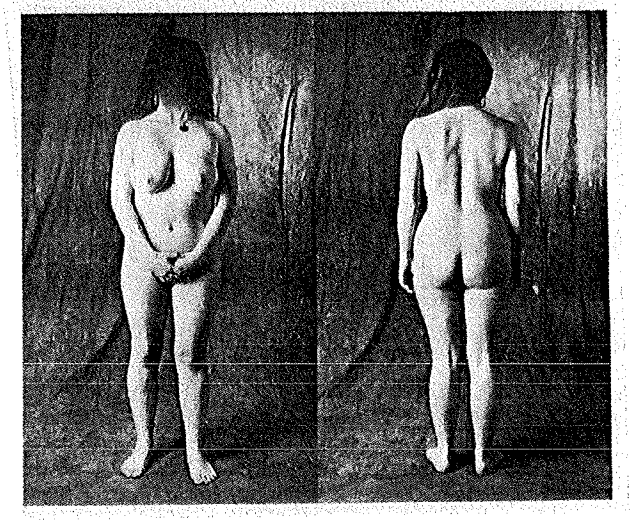

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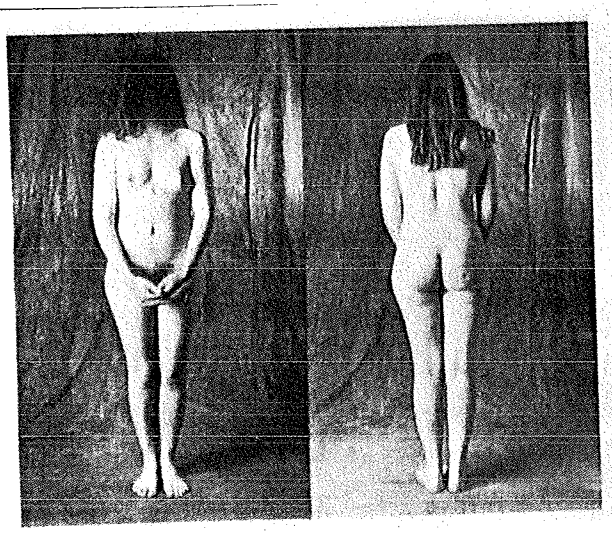

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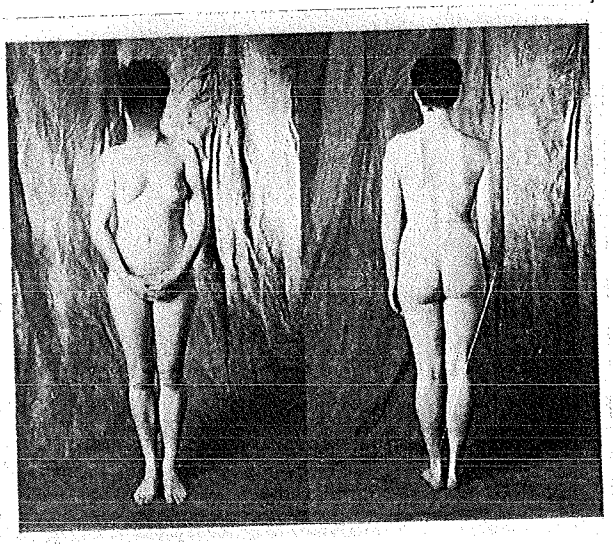

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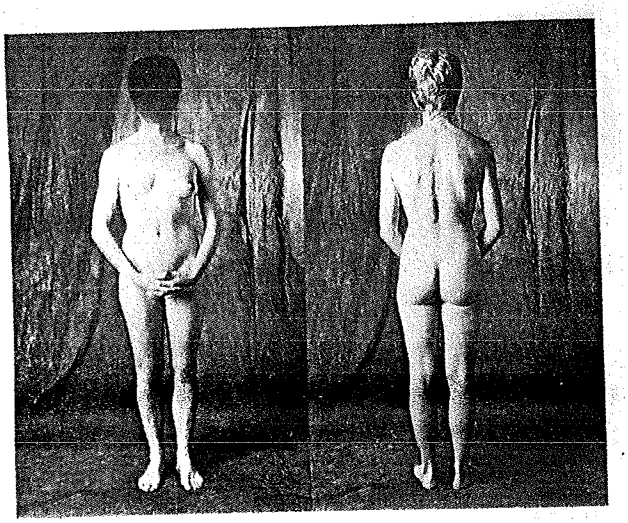

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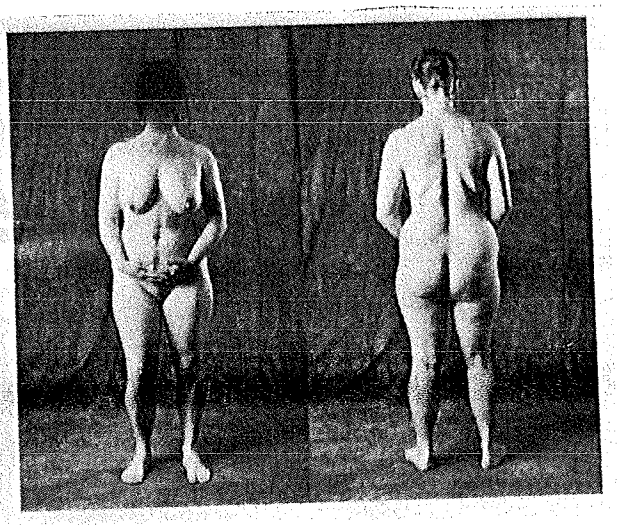

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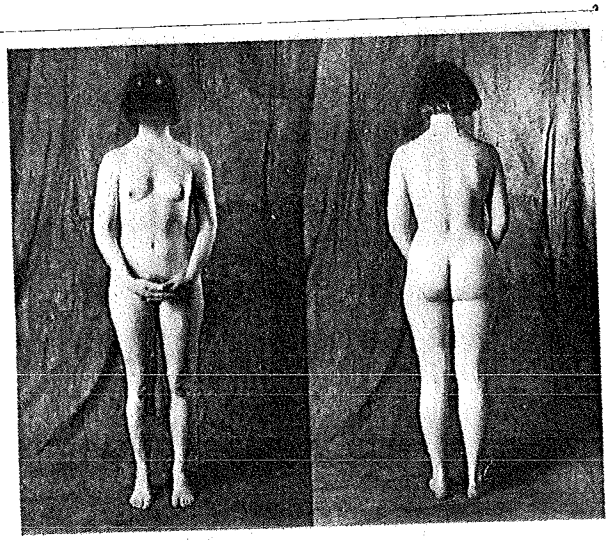

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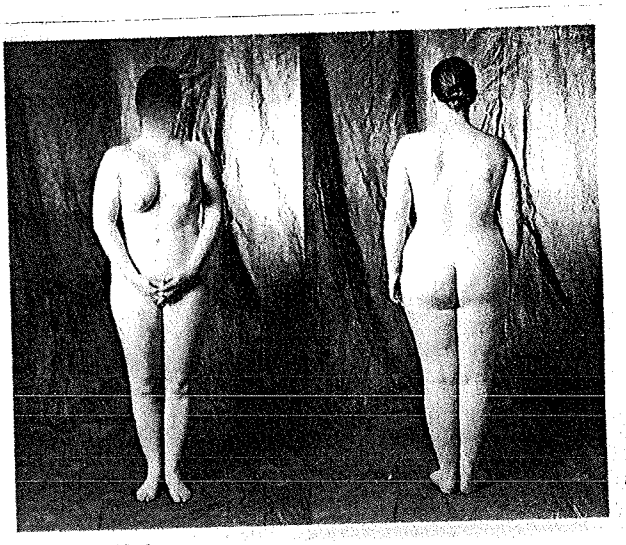

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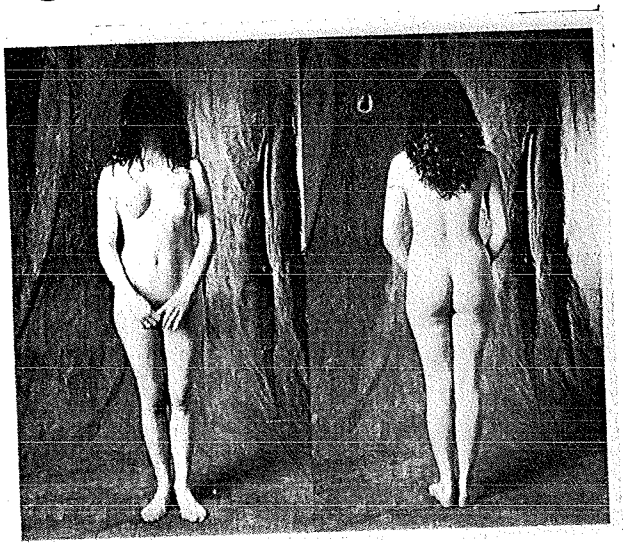

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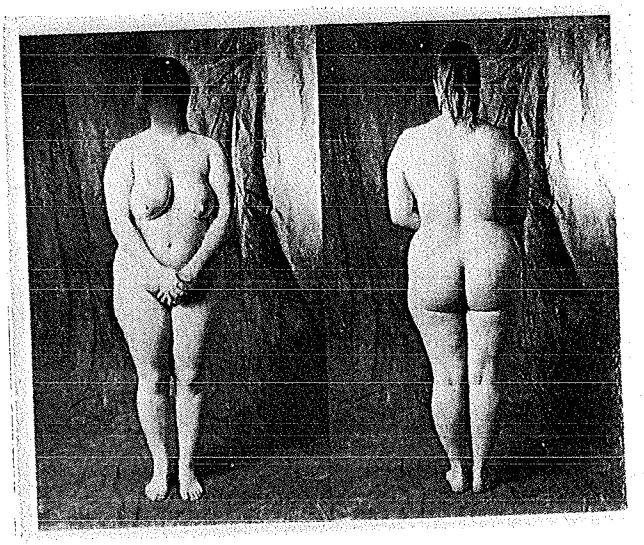

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Appendix C: The Measure

Body Types and Personal Judgements

Information Sheet

Many people believe that individuals with particular bodily features behave in certain ways or exhibit specific behavioural characteristics (e.g. red hair, beady eyes etc.).The research in which you are invited to participate is intended to replicate and extend research findings about body shape and personal judgements. We are interested in finding out what factors influence people when making personal judgements from full body photographs in the absence of facial cues.

Participation in this study means providing some general personal information and rating 10 **female or male** nude full body photographs on 14 personal characteristics. You will also be asked to indicate your interest inhaving a hypothetical sexual relationships with the person in each photograph.

Participation in this study is voluntary and anonymous **(Do not put your name on this or the questionnaire sheet).** Completion of this questionnaire will be taken as consent for the information you have provided to be used in this research. If for what ever reason you choose not to take part in this study, or wish to withdraw at any point after commencing, please return this questionnaire to the administrator before turning to the next page. If you wish to know more about this project or obtain the findings of this project when it is completed please contact J.J. Bangma, Department of Psychology, ext. 7190.

Thanks for your time and cooperation.

P.T.O.

(when ready)

Questionnaire

Personal Information

Your Age: _____ Height: _____ Weight: _____ Sex: M / F.

Sexual identity:

Heterosexual Homosexual Bisexual.

Ethnic Background:

Maori. European. Asian. Other:_____

Please look at the 10 female body photographs accompanying this questionnaire. Now, rate each photograph on all of the listed characteristics using the five point scales provided. Do this by clearly circling the figure you think best reflects the strength of your opinion. **Remember**, a rating of 1 on these scales means you strongly agree with the statement, a rating of 5 means you strongly disagree. **It is important that you rate all figures for all characteristics,** so if you find it difficult to rate on some characteristics, take an educated guess, but rate all characteristics.

Photograph a

1. Healthy

Strongly agree 1 2 3 4 5 Strongly disagree.

2. Youthful Looking

Strongly agree 1 2 3 4 5 Strongly disagree.

3. Wishes to have children

Strongly agree 1 2 3 4 5 Strongly disagree.

4. Faithful

Strongly agree 1 2 3 4 5 Strongly disagree.

5. Capable of having many children

Strongly agree 1 2 3 4 5 Strongly disagree.

6. Ambitious and career-oriented

Strongly agree 1 2 3 4 5 Strongly disagree.

7. Would be a good companion

Strongly agree 1 2 3 4 5 Strongly disagree.

8. Intelligent

Strongly agree 1 2 3 4 5 Strongly disagree.

9. Aggressive

Strongly agree 1 2 3 4 5 Strongly disagree.

10. Kind and understanding

Strongly agree 1 2 3 4 5 Strongly disagree.

11. Sexually experienced

Strongly agree 1 2 3 4 5 Strongly disagree.

12. Good sense of humour

Strongly agree 1 2 3 4 5 Strongly disagree.

For the remaining three items, if you are **not personally attracted** to the sex of this stimulus person, judge on the basis of how you think someone who is attracted to this sex would.

13. Physically attractive

Strongly agree 1 2 3 4 5 Strongly disagree.

14. Sexy

Strongly agree 1 2 3 4 5 Strongly disagree.

15. Now rate the likelihood that you would chose this figure for a) a long-term relationship such as spouse, and b) a short-term relationship such as a one night stand.

a. Long-term sexual relationship

Very likely 1 2 3 4 5 Very unlikely

b. Short-term sexual relationship

Very likely 1 2 3 4 5 Very unlikely

Photograph b

1. Healthy

Strongly agree 1 2 3 4 5 Strongly disagree.

2. Youthful Looking

Strongly agree 1 2 3 4 5 Strongly disagree.

3. Wishes to have children

Strongly agree 1 2 3 4 5 Strongly disagree.

4. Faithful

Strongly agree 1 2 3 4 5 Strongly disagree.

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6. Ambitious and career-oriented

Strongly agree 1 2 3 4 5 Strongly disagree.

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Very likely 1 2 3 4 5 Very unlikely

b. Short-term sexual relationship

Very likely 1 2 3 4 5 Very unlikely

Photograph c

1. Healthy

Strongly agree 1 2 3 4 5 Strongly disagree.

2. Youthful Looking

Strongly agree 1 2 3 4 5 Strongly disagree.

3. Wishes to have children

Strongly agree 1 2 3 4 5 Strongly disagree.

4. Faithful

Strongly agree 1 2 3 4 5 Strongly disagree.

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Photograph d

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Strongly agree	1	2	3	4	5	Strongly disagree.

11. Sexually experienced

Strongly agree	1	2	3	4	5	Strongly disagree.

12. Good sense of humour

Strongly agree	1	2	3	4	5	Strongly disagree.

For the remaining three items, if you are **not personally attracted** to the sex of this stimulus person, judge on the basis of how you think someone who is attracted to this sex would.

13. Physically attractive

Strongly agree 1 2 3 4 5 Strongly disagree.

14. Sexy

Strongly agree 1 2 3 4 5 Strongly disagree.

15. Now rate the likelihood that you would chose this figure for a) a long-term relationship such as spouse, and b) a short-term relationship such as a one night stand.

a. Long-term sexual relationship

Very likely 1 2 3 4 5 Very unlikely

b. Short-term sexual relationship

Very likely 1 2 3 4 5 Very unlikely

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